

# The Iron Age

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## Italy as an Iron-Producing Country.

The English consul at Leghorn, in discussing the possibility of using the iron deposits of Elba for steel-making, quotes the opinion of a mining authority of that district, as follows: "The Elba ores are generally rich, yielding on an average 58 per cent. of metal, and free from appreciable quantities of phosphoric acid; but they generally contain somewhat more sulphur than is desirable in ores intended for steel-making purposes, if used alone. It has, however, been pointed out, by an admixture with them of the calcareous and manganese ores from the mines of Monte Argentario, pig iron may be produced of the highest quality, containing some manganese and free from any excess of sulphur, and especially adapted for conversion into steel. The one drawback to the establishment of steel works in connection with the Italian mines arises from the fact that Italy possesses no coal deposits within its boundaries. There are, indeed, numerous mines of lignite in different parts of the peninsula, but metallurgical science has not yet succeeded in adapting this combustible to the smelting of iron ores. In its natural state it would be useless for this purpose, and charcoal cannot be made from it. Charcoal, it is true, is still abundant in Italy, and it is well adapted for smelting purposes; but year by year the production of it tends to decrease, as land is deforested and brought into cultivation. Then, again, extensive steel works, as contemplated in this case, would require something like 80,000 tons of charcoal—a quantity which it would be impossible to procure without difficulty or without forcing up the price of the commodity to an impossible level. Hence these works would have to depend upon coal imported from foreign countries, and this would probably mean from England, as the country best able to supply good coal at a low price.

"Notwithstanding this apparent disadvantage, it is contended that the steel works would answer well. It is pointed out that the steel manufacturers of England depend principally upon iron ores imported from Spain, &c., and without these their enormous production would be at a great disadvantage, and prices would soon attain a level different to what they now occupy. In the present day, when the consumption of coal in iron-making has been by the modern processes reduced to little over 1½ tons per ton of pig iron when rich ores are smelted—while, on the other hand, it may be taken that 2 tons of Spanish ores are required to make a ton of pig iron—the advantage for Italy, possessing rich ores on the seacoast, may well stand as a set-off against the disadvantages of having to import the coal required to smelt them. With iron ores containing 58 per cent. of metal, which could be delivered at the blast furnace at a cost not exceeding 7½ per ton, and manganese ores on the seacoast not 30 miles distant from Elba, there seems good reason to hold that steel could be made in Italy at a cost little exceeding the average price of the manufactured article imported from foreign countries. With the extension that Italy is giving to her navy, and having adopted the system of building her ships of war at home, it is looked upon as a natural sequence that she ought to be in a position to produce at home the materials required for their construction, instead of, as at present, being compelled to import everything from abroad. For an indefinite number of years Italy will require at least 60,000 tons of rails a year, and probably more, for new lines and renewals of existing ones. If all this material were produced in the country, besides giving work to many thousand men and developing the resources of the country, it is evident the money it represents would remain at home, with the exception only of the cost of imported coal. This may be approximately estimated at one-fifth of the whole amount, the other four-fifths representing the ores, fluxes, labor and profit."

Various localities, observes the *Ironmonger*, have been proposed as suitable for the erection of these works, but nothing has been decided as yet. If the scheme were carried out it would no doubt be detrimental to English metallurgical establishments, from which up to the present a large proportion of the iron and steel and heavy armor plates used in Italian naval yards has been drawn. The output of the Elba mines is rapidly increasing year by year. In 1871 the total was 50,800 tons only. In 1881 it

had risen to 403,000 tons. Of this ore the Government foundries used, in 1881, 19,232 tons, and private firms 10,500, the average price in 1881 having been 12 lire 17 centesimi per ton (the lire is about 9½d.). The quantity exported to France in 1881 was 95,532 tons, and to England 204,808 tons. Of late years in consequence of crises in the iron trade, the price of Elba ore has not averaged more than 8 to 9 lire per ton, but, owing to unexpired contracts for French furnaces at 13 lire 75c. per ton, the mines gave a handsome return, notwithstanding prevailing depression, so that in 1873-74 they produced a net income of 2,600,000 lire. During the past year freights to England for ore loaded at Rio (Elba) have averaged 5s. and to North America 8s. per ton. The mineral ores won in the Leghorn consular district in 1881 comprise, in addition to the iron ore above mentioned, 8000 tons of copper, 625 tons of lead, and 30,000 tons manganese ore. The pig iron manufactured in 1881 was at the Vada blast-furnace 4763 tons, at Cecina 1873, and at the three furnaces of Follonica 5764 tons. The ore employed comes chiefly from Elba. The establishments at Cecina and Follonica are closed during four or five months each year, viz., from July to November, in consequence of ma-

ticed in different parts of the country, and particularly to the system adopted by the New York Steam Company. Notwithstanding the fact that a good deal has already been said of the methods of this company, its underground pipe system, steam stations, &c., the account submitted elsewhere, together with the map showing the location of the mains and services, will be found unusually interesting, and will give the reader a very clear idea of the extent of the work done in this city. Contrary to general expectations, it would seem that street distribution of steam in cities is not a failure, and the limited time during which it has been tried, here while perhaps not having yielded highly gratifying results, has not been discouraging.

## The Bassett & Lohr Flanging Machine.

Knowing the interest which iron manufacturers and boiler-makers evince in reliable flanging machinery, we take pleasure in presenting in the accompanying illustration a machine turned out by the Bassett & Lohr Manufacturing Company, of Cincinnati, Ohio, and which, we understand, is doing very creditable work. From the engraving it will be seen that it consists of a heavy

partly or wholly flanged can be taken out and replaced in the machine to change the size or to finish the bending. It is entirely automatic in its action, and any man with ordinary intelligence can operate it almost on sight, and with little practice will never fail to turn out very satisfactory work. The machine has been very extensively tested, and the results, we understand, have in every case been extremely gratifying.

## Poor's Railroad Statistics.

"Poor's Manual of the Railroads of the United States for 1884," has just been issued, containing full statistics of railroad operations, construction, &c., in 1883. From its mass of valuable information we take the following summary:

The statements show a mileage at the close of the calendar year 1883 of 121,592 miles, 6753 having been constructed within the year. The total length of completed road at the close of the companies' fiscal year was 120,552 miles. The average mileage operated during the year was 110,414. The amount of share capital issued by the several companies up to the close of their respective fiscal years was \$3,708,060,583, an increase from the previous year of \$207,024,759. The

per cent. The earnings per mile of all the railroads operated for 1883 were, gross, \$7461; net, \$3051; in 1882, gross, \$7377; net, \$3005; in 1881, gross, \$7548; net, \$3078; in 1880, gross, \$7475; net, \$3318; in 1879, gross, \$6652; net, \$2761.

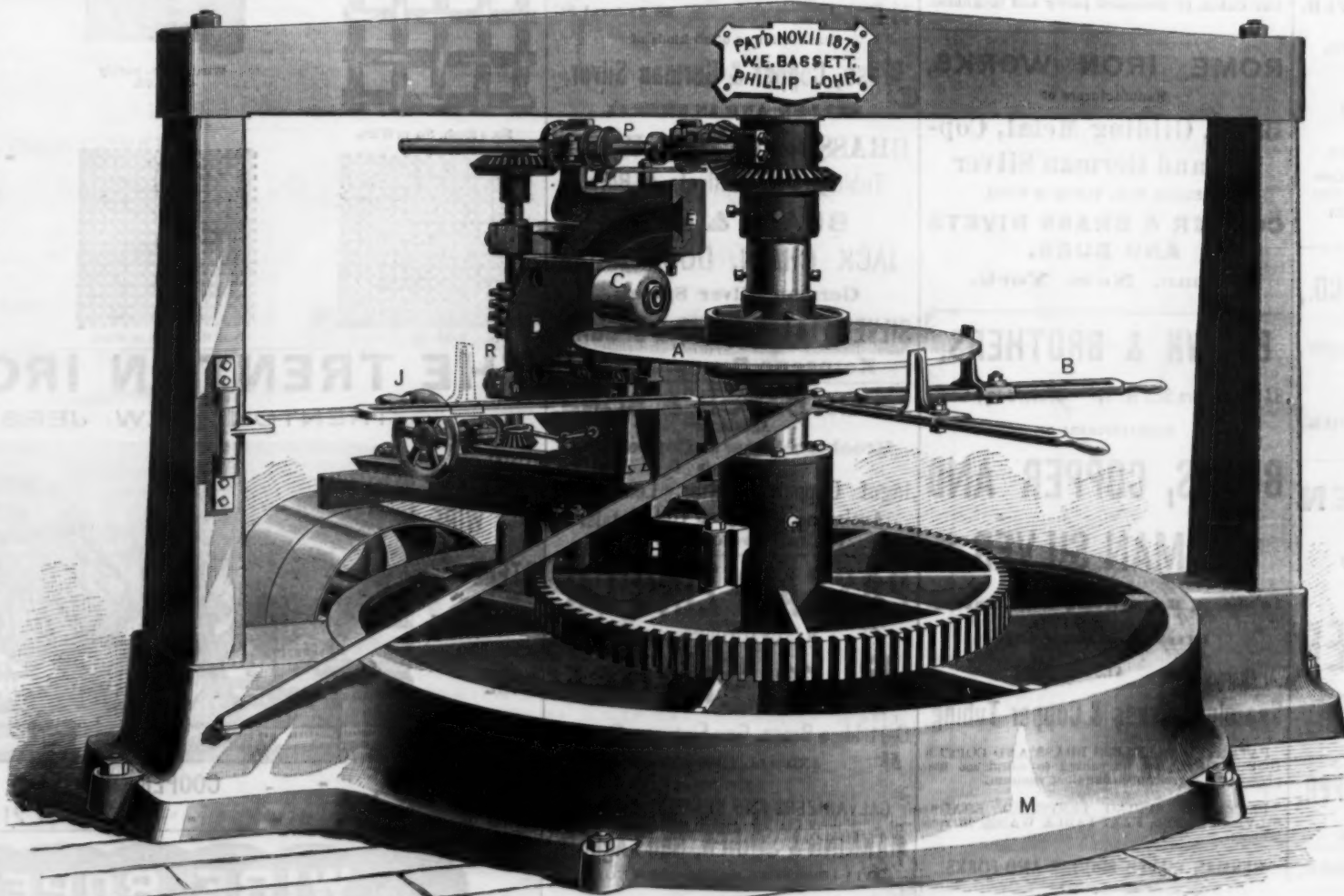
Since 1880, a period of three years, there have been opened in the United States 28,405 miles of railroad. The increase of share capital and indebtedness of all the companies for the three years ending December 31, 1883, was \$2,093,433,054, the cost of the new mileage as represented by share capital and debt being about \$70,000 per mile. The increase in the three years of the funded debts of all the companies was \$924,165,440; of their floating debts, \$169,880,406; of the two, \$1,094,045,846. It is not probable that the cost of the mileage constructed in the three years equaled the increase of funded and floating debts by at least the sum of \$200,000,000. The cost of the mileage constructed certainly did not exceed \$30,000 to the mile. The whole increase of the share capital, \$999,387,208, and a portion of the funded debt, was in excess of cost of construction. Stocks and bonds to the amount of \$530,132,000 were listed at the New York Stock Exchange in 1883. The amount of stocks and bonds listed was equivalent to about \$80,000 per mile of new road built during the year. A considerable amount, however, of the securities listed was on account of old works.

One cause of the great decline in the shares of lines which were dividend-paying is the competition resulting from the construction of rival lines. The result of this competition is particularly shown in the two great Pacific roads, the Union and Central, both of which for many years have regularly paid dividends, but both of which have now been compelled to forego them. A few years ago there was in public estimation no more inviting field for railroad enterprises than the State of Colorado. A vast system of railroads, covering the whole State, was constructed with very great rapidity, involving a nominal expenditure of nearly \$100,000,000, almost the whole of which is unproductive. It is safe to assume that the new mileage constructed in the past three years cost about \$30,000 to the mile; and that when our people build, say, 10,000 miles of line in one year, they expend upon them \$300,000,000. In addition a very large amount of fresh capital is yearly expended on old lines, so that we have for many years past been expending upon railroads considerably over \$1,000,000 for every working day in the year.

If it be assumed that the cost in money of all the roads in operation in the United States in 1883 did not exceed, as it certainly did not, the amount of their funded and floating debts, \$3,787,107,283, the

actual investment was a most profitable one. The net earnings for the year were \$336,911,884, a sum equaling about 9 per cent. on their cost. If the fictitious capital could be eliminated from their accounts, their success as investments would have no parallel. If to net income be added the advantages that flow from them the result would be a matter of especial wonder. Our railroads the past year transported over 400,000,000 tons of freight. At \$25 the ton the value of this freight would equal \$10,000,000. The total movement of freight on all the railroads of the United States for 1883 equaled 44,064,923,445 tons moved one mile, at an average charge of 1¼ cents per ton per mile. The total number of passengers transported on all the railroads of the United States the past year, not including the New York elevated roads, was 312,686,641—a number equaling more than six times the total population of the United States in 1880. The total movement on all the roads equaled 8,541,309,674 persons moved one mile, at a charge of 4.42 cents per passenger per mile.

Mr. Thomas Fletcher, an Englishman, has just brought out a new system of blowpipe for use in repairing machinery without the necessity of pulling down and re-erecting. It works as an injector, taking a 5-foot blower, which supplies one-fifth the air necessary, the remainder being drawn in by the momentum of the air from the blower. One of these blowpipes, burning at full power 300 cubic feet of gas per hour, and requiring a 1½-inch main to supply it, was recently tried, when a good brazing heat was got up on a T-joint in a 3-inch-bore wrought-iron pipe in five minutes from the time of starting.



FLANGING MACHINE, BUILT BY THE BASSETT & LOHR MFG. CO., CINCINNATI, OHIO.

laria. The sales of pig iron effected by the company working the Elba mines and other Government establishments were in 1881: To England, 2500 tons; to France, 300 tons; to Italy, 6248 tons. One furnace at Follonica was blown out, while smelting at Colle and Valpiana was entirely suspended.

The manganese ore is derived from the mines of Monte Argentario, near Orbetello, where workings were commenced in 1874 by Rae Bros., of Leghorn. The yield from 1875 to 1879 was 63,000 tons, and was exported in British vessels to the United Kingdom, where it is used for making steel. In consequence of the crisis in the iron trade work was then partially suspended, but in the campaign of 1880 it was resumed with considerable activity, the yield being 24,471 tons; increased in 1881 to over 30,000 tons. Owing to present depression shipments have almost ceased. As regards copper, in 1880 the Fenice Massetana Mine, in the province of Grosseto, was the most productive, the output being 4452 tons, representing a value of 422,992 lire, and surpassing the once famous copper mine of Monte Catini, in the Val di Cecina, which some years ago is said to have yielded a clear annual income of £40,000. The present produce of this mine is about 200 tons a month, and is shipped to Genoa, where it is smelted by a recently-created company, using furnaces in which fusion is said to be obtained by an electric current.

Mr. Wm. P. Shinn's paper on "The Distribution of Steam in Cities," read at the recent Cincinnati meeting of the American Institute of Mining Engineers, and published practically in full in another column, contains much interesting matter relating to steam heat and power distribution as prac-

bed-plate, M, cast in one piece and having a hub in the center extending to the top end of the hub G, on which it is made to turn by gearing from an upright shaft, the latter being driven by gearing from the driving pulley shown in the lower left-hand corner. The slide H carries a semicircular slideway, E, and is adjustable by means of a screw, enabling the size of boiler head to be regulated according to the requirements of any special case. The sliding-block D, which carries the bending rollers C, is made to move in its slideway, E, by means of a screw shown at the extreme left and operated by a series of bevel gears, and may be stopped at any point by means of a dog, B, which acts on a disengaging clutch, P, and thus throws the vertical screw out of gear. The hand-wheel J serves for bringing the slide to its proper place for flanging.

The plate to be flanged is placed between the clamps, with its edge between the flanging rollers, and, after being properly adjusted, is rigidly held in place by raising the lower clamp by means of a screw driven by friction. The main housing carries a roller to prevent the plate from being forced from between the flanging rollers, this tendency arising from the fact that the bending rollers taper, the large end of the top or inside roller being in the position shown in the engraving. These rollers are made so in order to upset the metal in the flange and to effect a proper distribution of metal. The machines are so arranged as to make a boiler head within any given range of sizes in less than 1 minute, and entirely dispense with some of the disadvantages attending other methods of flanging. The machine can be set to bend any flange past right angle to overcome stretching in punching rivet holes, and any head, if necessary, when

funded debts of the several companies amounted to \$3,455,040,383, an increase from the previous year of \$219,497,060. Their floating or unfunded debts amounted to \$332,370,345, an increase of \$61,199,383 from the previous year. The total increase of share capital and of funded and floating debts from the previous year equaled \$477,721,202. The total amount of liabilities at the close of 1883 was \$7,495,471,311. The total per mile for completed mileage was \$62,176. The total of stock and liabilities for 1882 was \$7,016,750,109; per mile, \$61,303. The total for 1881 was \$6,278,565,052; the amount per mile, \$60,645. The total for 1880 was \$5,402,038,257; per mile, \$58,624. The total for 1879 was \$4,872,017,517; per mile, \$57,730. The increase of cost in the four years since 1879 as represented by share capital and debt equals \$4416 per mile, and for the whole number of miles (120,552) constructed a total of \$535,974,192.

The gross earnings of all the roads for their several fiscal years of 1883 were \$823,772,924, an increase from the previous year of \$53,563,035. Of the gross receipts, \$215,287,824 were received from passengers, \$549,756,695 from freight, and \$58,728,405 from miscellaneous sources. The net earnings for the year were \$336,911,884, an increase of \$21,461,082 from the previous year. The amount of interest paid was \$173,139,064, an increase of \$18,843,684 from the previous year. The amount of dividends paid was \$102,052,548, an increase of \$21,114 from the previous year. The percentage in 1883 of gross earnings to investment was 10.99 per cent.; in 1882, 11.74; in 1881, 11.18; in 1880, 11.36; in 1879, 10.80. The percentage of net earnings to investment in 1883 was 4.49 per cent.; in 1882, 4.81; in 1881, 4.56; in 1880, 5.04, and in 1879, 4.40



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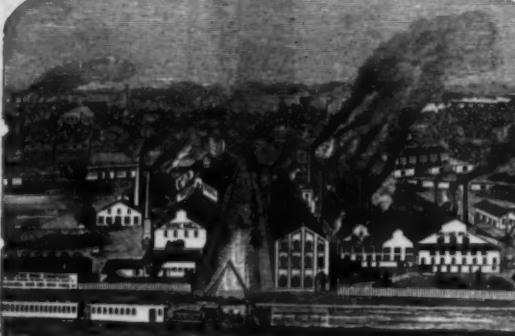
  
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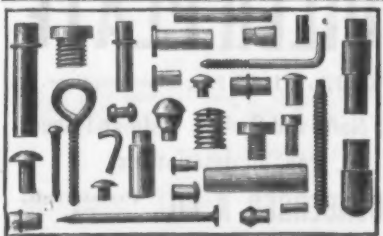


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**Momentum and Force of Impact of  
Water Moving in Pipes.**

BY JOHN W. NYSTROM.

In a recent experiment on strength of flat  
cast-iron boiler heads, made at the Franklin  
Institute by hydrostatic pressure, it was  
found that the pressure-gauges showed a  
much higher pressure than the boiler shell  
could have borne, yet the cast-iron head  
burst, while the shell remained intact. The  
experimenter attempts to explain this phe-  
nomenon as follows: "In the matter of  
applying hydrostatic pressure, the momen-  
tum of the fluid as forced into the vessel  
plays an important part, and sometimes, if  
not frequently, by concussion, causes rupture  
or breaks in vessels at pressures far below  
those that they have resisted under slow and  
steady application of hydrostatic force." The  
same experimenter has "found that these  
facts were either not generally known, or  
else their importance had been frequently  
overlooked where they should have been  
considered and attentively regarded."

The subject of momentum of a moving  
body is the first lesson in dynamics of matter  
—namely, that the force  $F$  is to the mass  $M$   
as the velocity  $V$  is to the time  $T$ .

$$F : M = V : T \dots\dots\dots 1$$

$$\text{Momentum of time } F T = M V, \text{ momentum of motion} \dots\dots\dots 2$$

$$\text{Force of impact } F = \frac{M V}{T} \dots\dots\dots 3$$

When a moving mass is suddenly stopped,  
the resistance it meets with is generally  
called the force of impact. The formulae  
apply equally well in starting the mass from  
rest to motion as to bring it from motion to  
rest, and it will be perceived by Formula 3  
that the shorter time  $T$  in which the mass is  
set in motion or brought to rest, the greater  
will be the force of impact. When the mass  
is set in motion or brought to rest gradually  
in a considerable time, the force is not called  
impact.

In the practical application of these formulae  
the mass must be converted into  
weight  $W = g M$ .

$$\text{Mass } M = \frac{W}{g} \dots\dots\dots 4$$

$g = 32.17$ , the acceleratrix of gravity.  
The practical formula will then be, when  
Formula 4 is inserted for  $M$  in Formula 3, as  
follows:

$$\text{Force of impact } F = \frac{W V}{g T} \dots\dots\dots 5$$

Applying this to water moving in a pipe,  
 $W$  means the weight of the water in the  
whole length of pipe in pounds.  $V$  = velocity  
of the water in feet per second, and  $T$   
= time in seconds in which the motion of  
the water is stopped. Formula 5 gives the  
force of impact in pounds.

In the case of a hydrostatic test of a  
steam boiler as above referred to, the water  
is driven through a pipe into the boiler by  
a force pump of known dimensions and operation,  
for which the following notation is adopted:

$a$  = area of the cross-section of the pump-plunger.  
 $v$  = velocity with which the plunger  
moves.

$A$  = cross-section area of the pipe connect-  
ing the plunger with the boiler.

$L$  = length of the pipe in feet.  
If  $A$  is expressed in square feet and the  
weight of a cubic foot of water is 62.33  
pounds at a temperature of 60° F., then the  
weight  $W$  of the water will be

$$W = 62.33 A L \dots\dots\dots 6$$

Having given the velocity  $v$  of the pump-  
plunger, that of the water in the pipe will be:

$$V = \frac{a v}{A} \dots\dots\dots 7$$

Now insert Formula 6 for the weight  $W$ ,  
and Formula 7 for the velocity  $V$  in Formula  
5, and the practical formula for hydrostatic  
tests will be:

$$\text{Force of impact } F = \frac{62.33 A L a v}{g T A} =$$

$$\frac{62.33 L a v}{g T} \dots\dots\dots 8$$

This formula gives the force of impact on  
the whole area  $A$  at the boiler end of the  
pipe, which force is not indicated on the  
pressure gauge, but if Formula 8 be divided  
by the area  $A$  of the pipe in square inches  
and the area  $a$  of the pump-plunger also ex-  
pressed in square inches, then the force of  
impact per square inch should show on the  
pressure gauge at the moment the motion of  
the water in the pipe is stopped.

The value  $g$  divided into 62.33 is nearly  
2 and can be practically so considered, and  
we have the force of:

$$\text{Impact per square inch } f = \frac{2 L a v}{T A} \dots\dots\dots 9$$

This formula shows that the larger the  
area  $A$  of the pipe is, the smaller will be the  
force of impact per square inch in the boiler,  
and vice versa. The impact per square inch  
is directly as the length  $L$  and inversely as  
the area  $A$  of the pipe. In hydrostatic boiler  
tests the pipe between the pump and the  
boiler is generally made too small, which in-  
creases the force of impact and may over-  
strain the boiler if the pump is worked fast.  
The diameter of the pipe should not be less  
than that of the plunger, but better to make  
it larger. Sharp bends and friction in the  
pipe, air in the water and elasticity of the  
materials of which the boiler is made con-  
siderably diminish the force of impact.

Long suction-pipes very often give trouble  
by force of impact, which can be avoided by  
an air vessel on the suction side of the  
pump. The hydraulic ram operates by force  
of impact, but the formulae are different  
from those for a pump.

When a pump is worked by crank motion,  
the force of impact of the water in the pipe  
may be reduced to no importance, de-  
pending upon the length of the pipe, but the  
velocity of the pump-plunger and length of  
the pipe may be of such proportion that the  
momentum of the water cannot keep time  
with the strokes, which may result in  
bursting of the pipe if the momentum is not  
relieved by air vessels.

When the pump is worked by hand and a  
lever, the velocity of the plunger is nearly  
uniform to the end of the stroke, where it  
suddenly stops, and the momentum of  
the water continues with its force of impact.



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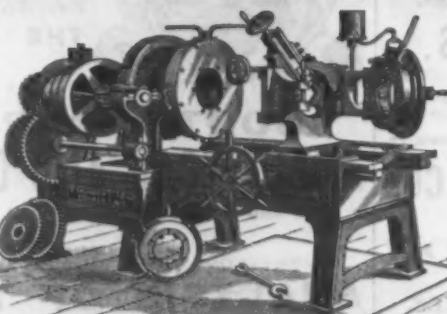
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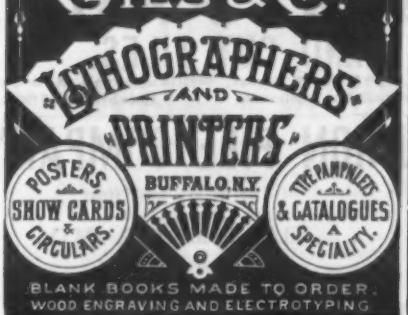
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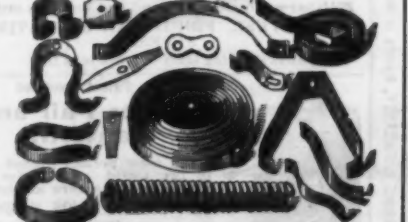
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The force of impact given by Formula 3 can never be greater than the resistance against the water entering the boiler from the pipe. Let  $p$  = hydrostatic pressure per square inch in the boiler.  
Then we have the time  $T$  of impact to be:

$$T = \frac{2L}{pA} \dots \dots \dots 10$$

This Formula 10 will be correct if the pressure  $p$  does not increase in the time  $T$ ; but if there is no elasticity in the materials of which the boiler is made, and the air in the water is compressed to a high degree, then the motion of the water in the pipe will be stopped in a shorter time than  $T$ , and thus increase the force of impact beyond the hydrostatic pressure from the pump, and the index on the pressure gauge will thus be suddenly pushed forward and returned to the normal pressure. If there be a maximum hand on the gauge dial, that hand may be carried forward by its own momentum far beyond the maximum force of impact, and thus indicate a wrong pressure.

These difficulties with hydrostatic tests can be avoided by making the inside diameter of the delivery pipe sufficiently large—say one-and-a-half the diameter of the plunger.  
The strength and safety of cast-iron heads under steam pressure cannot be determined by cold-water pressure, because cast iron is a treacherous metal for that purpose, and its danger consists in shrinkage strain caused by sudden change of temperature.

**The British Employers' Liability Act.**

Notwithstanding the fact that the British Government lacks the broad elements of popular representation which obtain in this country, the rights of workmen have been more carefully covered by legislation in Great Britain than here. Indeed, so far has the British care of the workman been extended by act of Parliament that it seems as though the employer is now in need of sympathy from the governing classes. The liability of an employer for damages in case of an employee suffering personal injury while engaged in the discharge of his duties is the subject of a special act of Parliament, which was passed in order to make employers more watchful over the safety of those in their employ, though, of course, the law is intended only to take cognizance of cases of negligence on the part of proprietors of works. Still, there are very few instances of actions brought under this law which are decided adversely to the employee. One of the most interesting cases of this character is reported in recent issues of English journals. As the circumstances were peculiar, a full account of the controversy and the decisions of the respective courts appealed to is herewith given. It will be understood that the employers of Great Britain have formed an insurance company, under the Employers' Limited Assurance Corporation, Limited, in order to lighten the burdens of the operation of this act, which might occasionally bear very heavily upon individual firms or companies. An insurance question is therefore involved in this trial, but at the same time the liabilities of employers for their workmen's injuries are very fully treated, as will appear upon careful reading.

The title of the case was the Henry Rifled Barrel Engineering and Small Arms Company vs. the Employers' Limited Assurance Corporation, Limited. The action arose out of the explosion of a 16½-inch shell, which had been brought by Lord Charles Beresford from Egypt, as a present, it is believed, for the Prince of Wales. The shell, which had been used on the voyage by Lord Charles Beresford as a candlestick, but ultimately turned out to be a live shell, though it had been fired into Alexandria, was sent by him to the defendants, who had consented to cut it in two, so that it might be made into an ornament. The shell, which was believed not to be so charged, was handed to a workman, described as a fitter, who set to work to cut it in two. Finding that there was something inside it, he got an implement with which to scrape it out. Some of the substance he threw on the fire, which flared up. Some more he placed on a board, and a person of curiosity threw some on the fire, with the result that the chimney was nearly blown out. The workman stated that he was then unwilling to go on, but that the foreman said to him: "There is a hole at the top of the shell, and if there is an explosion the hole is large enough to let it go out without hurting you." However, the workman continued scraping, with the result that a second explosion occurred, which inflicted severe injuries on him. He recovered damages in the county court against the plaintiffs, who now sought to recover the same from the defendants, with whom they had insured themselves against claims under the Employers' Liability act, 1880. By the policy the defendants agreed to pay sums for which the employers should be liable under the act of 1880 as and for compensation for personal injury caused to any workman in their service while engaged in the employers' work in either of the occupations mentioned in the schedule thereto. The schedule specified the occupation of fitter. At the trial, before Mr. Baron Huddleston, a special jury found that the workman was at the time of the accident in the employment of the plaintiffs in that occupation, and judgment was entered for the plaintiffs. The defendants moved for a new trial, and a divisional court was divided in opinion, Mr. Justice Day being of opinion that there was no evidence for the jury that the workman was engaged in any occupation described in the policy. The result, therefore, was that the judgment stood. Thereupon the defendants appealed. It was now urged on their behalf that it was not part of the plaintiff's business to cut shells, and that that was certainly not within the scope of a fitter.

Their lordships gave judgment dismissing the appeal, without calling upon the respondents' counsel. The Master of the Rolls said that a great effort had been made by the company to avoid liability, but the policy did not seem to him to be a very difficult one to construe. The employers were to be insured against sums paid for injury caused to any workman in the employers' service while engaged in the employers' work. According

to that, if the workman was in the employers' work, whatever work he was engaged upon—that is, if he was doing something which the employers told him to do—he would be doing something while engaged in the employers' work. The subsequent words as to the workman being engaged in either of the occupations mentioned in the schedule confirmed that, but applied to the workman and not to the work. If the workman in question was doing what his employers told him to do, and if he was either of the persons mentioned in the schedule, he was within the terms of the policy. For fear of accident his lordship would say that it might be (though he did not think it was) that if the company had engaged as part of their business of engineers to draw unexploded shells, which part of their business they had not been carrying on before, that would be a new class of business, and they could not recover for any claim in connection with that unless there was a new policy, if they were doing what was outside the ordinary business of engineers. But it was clear that the shell was taken in as an exploded shell, that it might be cut in two and made into something. There was evidence that it was part of the business of general engineers to receive iron, old or otherwise, and make it into something else. Therefore the shell was taken in order that it might be dealt with in the way in which ordinary engineers would deal with it, and, therefore, so far within the business of the employers. There was evidence that it was fitters' work to cut up iron and make it into some other form. Therefore, the workman was employed upon work which was part of the business of his employers, and upon part of the work which he was engaged as a fitter to perform. The jury were right in finding that he was working as a fitter. Therefore the employment was within the terms of policy, and his lordship agreed with the judgment of Mr. Justice A. L. Smith, that the appeal should be dismissed. Lord Justice Bowen was of the same opinion, but was inclined to think that no personal injury to a workman, though he was engaged in the employers' work, would be the subject matter of indemnity, unless he was engaged in one of the occupations described in the schedule, so that there would be no indemnity where a person engaged as a fitter was put to an occupation not described in the schedule. Lord Justice Fry also agreed that the appeal should be dismissed.

**The Sanitary Aspects of the Electric Light.**

The good or evil influence upon the health of the artificial light we use, says the London Engineer, is of the very highest importance, although hitherto it has to a great extent been overlooked. Ancient custom has so familiarized us with combustion as a source of light that until recent years we hardly ever dreamed there could be any other. Nevertheless, the introduction of the electric light has been opening our minds of late to the advantages of a purer kind of illumination. Pure air is what we all seek when we go to the seaside or the mountain top during our holidays. How important, then, is it that we should have pure air in our homes. The necessity which obliges us to live in towns also obliges us to live in a more or less vitiated atmosphere. The mere fact of so many living beings crowded together is of itself sufficient to deteriorate the air. Assuredly, it is not desirable that the very light we use should also vitiate the atmosphere. Pure air and light are essential to good health, but in close, ill-ventilated city offices, and in thousands of homes and workshops, what prospect is there of pure air while the lights which are burned often half the day are of themselves polluting it? For not only does a candle oil, or gas flame waste the oxygen of the air, and thus rob it of its life-supporting virtue, but it actually soils it with noxious vapors, the products of combustion. These are chiefly water or steam and carbonic acid; but carbon dust, or soot, is also thrown off, and, in the case of gas, sulphurous acid. Gas and other lights produced by combustion not only rob the air of its health-giving oxygen; they adulterate what remains of it. Carbonic-acid gas, which is supplied to the atmosphere from a flame, is an active poison fatal to animal life. It is the "choke damp" of the miner; and though always present in minute quantities in the atmosphere, it becomes dangerous when in excess. On the score of health alone the introduction of electric light ought to be hastened as much as possible, nor should it be only the luxury of the rich, as a famous electrician, recently deceased, proclaimed it, but the necessity of the poor. Where purity and brightness are most needed, there purity and brightness should first come.

**The Outlook for Wheat.**—There is no longer any doubt that the home crop will exceed the average, says the Minneapolis Tribune. That of 1881 was upward of 383,000,000 bushels; the 1882 crop was in round numbers 504,000,000, and that of 1883 was approximately 420,000,000 bushels. The lowest estimate for this summer's harvest is that of the New York Produce Exchange, which places the figure at 468,380,000 bushels. The Agricultural Bureau gives a higher estimate, and various independent authorities make predictions ranging as high even as 550,000,000 bushels. Five hundred millions would seem to be a safe average estimate. Of this quantity we could spare to foreign consumers not far from 200,000,000 bushels, if required. In ordinary years Europe provides about four-fifths the amount of wheat she consumes. Her average production is somewhat more than 1,100,000,000 bushels, and she would, therefore, import something like 275,000,000 bushels. Until very recently, however, it was believed that the European crop might this season be from 75,000,000 to 100,000,000 bushels larger than the average, which would, of course, considerably reduce the demand for the foreign article. However, late advices considerably modify this estimate, and the European output may not exceed the average. Consul-General Merritt estimates the average wheat crop of the United Kingdom at 80,000,000 bushels and the average importation at 110,-



Paris, 1878.

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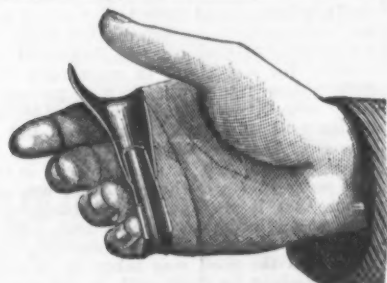
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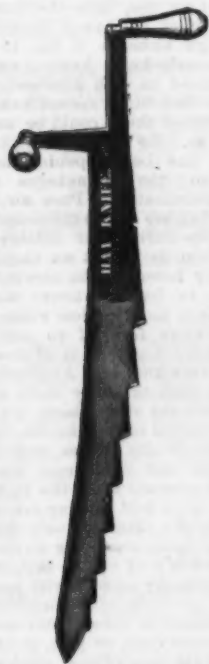
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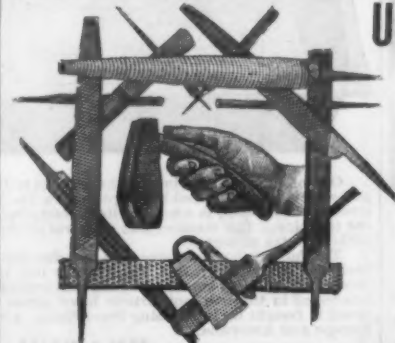
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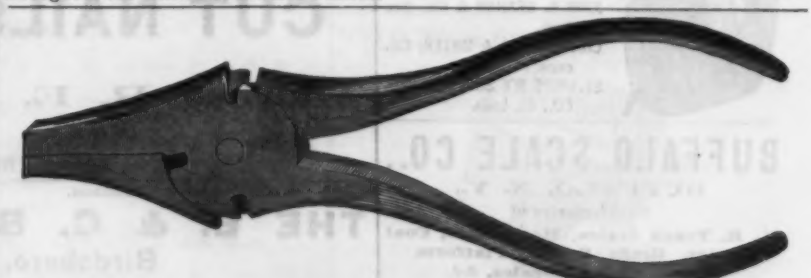
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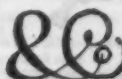
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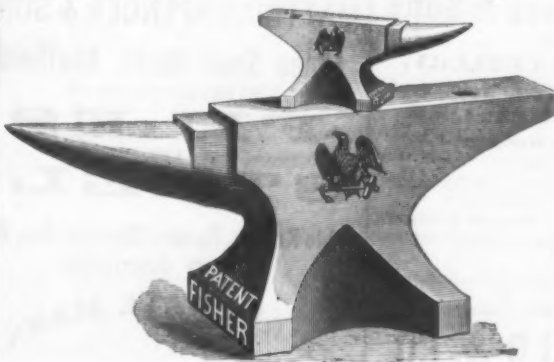
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000,000. The latter figure is probably too  
low. Good authorities would place England's  
importation in recent years at from 120,000,  
000 to 130,000,000. The State Department,  
in a recent report, estimates that during the  
current year 375,000,000 bushels of wheat  
will be moved from the exporting into the  
importing countries of the world, and that  
of this amount the United States should be  
called upon for 188,000,000, and all other  
exporting countries for 187,000,000. It is  
needless to remark that large figures of this  
sort should be received with very great cau-  
tion. It is of record that in the fiscal year  
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in addition to these and the accompanying  
descriptions, valuable chapters on such mat-  
ters as, for example, the action of the recip-  
rocating parts of the engine, advantages of  
high speed, conversion of heat into work in  
the cylinder, the attainable limit of economy  
and others of equal importance. The en-  
gravings are finely executed, the typog-  
raphy is excellent, and the catalogue, taken  
altogether, is a more than generally desir-  
able one.

### Steam Engines and Centrifugal Pumps.

Messrs. Heald & Morris, of Baldwinville,  
N. Y., have sent in their illustrated cata-  
logue of steam engines and centrifugal  
pumps, and which in addition gives particu-  
lars of several other appliances, such as the  
Craig sight-feed lubricator, pulleys, leather  
and rubber belting, &c. Interesting para-  
graphs are devoted to steam engines, steam  
engine economy, methods of adjusting their  
engine valve, and other matters of a similar  
character, the whole forming a valuable and  
well-arranged collection of hints and data.  
A separate pamphlet accompanying the cata-  
logue contains testimonials of their custom-  
ers in convenient order for reference, giving  
those relating to a particular size by them-  
selves, so that the different varieties of work  
being done by each size can readily be seen.  
This list will undoubtedly prove interesting  
to those contemplating the purchase of one  
or more of Messrs. Heald & Morris's engines,  
showing just what they are doing and what  
results are being obtained.

### Brown & Sharpe Manufacturing Company.

The new catalogue recently issued by the  
Brown & Sharpe Manufacturing Company,  
of Providence, R. I., is in every way an  
attractive specimen of trade publication,  
and its various illustrations, representing  
different types of machine tools and other  
appliances built by them, together with the  
descriptive particulars, will, without doubt,  
prove of a good deal of interest to some.  
Besides treating of milling and grinding  
machinery, gear cutters, lathes, &c., the  
catalogue embraces an interesting extract  
relating to standard gears, recently spoken  
of in our columns, and in view of the in-  
creasing importance of the subject the  
matter here given will undoubtedly prove  
an acceptable addition to its literature.

### An Improved Balance Dynamometer.

The Lawrence Machine Shop, Lawrence,  
Mass., have recently issued an interesting  
little pamphlet relating to an improved bal-  
ance dynamometer now built by them. It  
contains a general view of the apparatus and  
gives a full description, which we think may  
possibly prove of interest to some of our  
readers. The pamphlet, we believe, is sent  
free on application, and those so inclined  
may readily obtain it.

### Machine Tools for Iron and Brass Work.

Messrs. Warner & Swasey, of Cleveland,  
Ohio, designers and manufacturers of iron  
and brass working machine tools, have issued  
a very neatly-arranged and attractive cata-  
logue illustrating and describing the different  
styles of machines turned out by them. It  
measures about 5 x 7 inches in size, covers  
24 pages and will be found a very convenient  
pamphlet for those interested in this line of  
machinery. Accompanying the catalogue is  
an engraved card showing on one side an  
equatorial telescope made by them and  
giving on the other various matters of in-  
terest directly connected with it.

### The Whittier Machine Company.

The new catalogue of the Whittier Machine  
Company, of Boston and New York, man-  
ufacturers of elevators and boilers, was  
brought out a short time ago and can very  
justly lay claim to more attention than is  
ordinarily given to publications of this kind.  
Considered from the standpoint of both  
manufacturer and purchaser, it contains a  
most complete and serviceable representa-  
tion of what the company are now placing on  
the market, the descriptions being clear and  
concise, the engravings betraying great care  
in execution, and the general data submitted  
being such as to readily enable the making  
of a judicious selection. After a general in-  
troduction, referring to the increasing de-  
mand for rapid transit to the upper stories  
of buildings and the growth of the elevator  
industry, short chapters on the minor details  
of elevators, classification, speed, efficiency  
and comparative cost, elevator safeties, &c.,  
the catalogue continues with an extended  
series of illustrations of the different styles  
of steam, hydraulic and belt elevators, auto-  
matic safety hatch-covers, ventilating fans  
for passenger elevators, elevator indicators,  
&c., and boilers and boiler settings. The  
catalogue is 10 x 12 inches in size and covers  
52 pages.

### Holding Machinery.

Messrs. Edwin Harrington, Son & Co, of  
North Fifteenth street and Pennsylvania  
avenue, Philadelphia, Pa., have issued a neat  
little catalogue relating to their various ar-  
rangements of portable double-chain screw-  
hoisting machines and systems of overhead  
tramways. The publication is fully illus-  
trated throughout, and the particulars given  
are such as to enable intending purchasers  
to readily make a selection of what they  
desire.

### The Keely Motor Stockholders.

Probably no other mechanical enterprise  
was ever blessed with such a patient set of  
backers as the Keely motor. For years they  
have responded to frequent calls for money  
to enable the originator of the scheme to  
carry on his experiments, exhibiting a quiet  
faith simply inexplicable. But, according to  
a Philadelphia paper, they are at last  
growing tired. On the 29th ult., midnight,  
the officers and directors of the Keely Motor  
Company went into executive session at the  
Lafayette Hotel, Philadelphia, to discuss  
some very important matters connected with  
that corporation. The directors had spent  
the evening with Mr. Keely at his Twentieth  
street workshop. The object of their visit  
was to learn from the discoverer and inventor  
when he would be ready to give an exhibi-  
tion, and to ascertain other points which the  
stockholders have been clamoring for.  
According to one to one of the gentlemen,  
letters have been pouring in during the past  
three months from stockholders who desire  
to know when the motor will be ready.  
Some of these epistles have been very pun-  
gent, and insinuated in strong language  
that the directors are not doing their duty,  
and that money is being wasted with no  
prospect of a return. Mr. Keely has been  
appealed to time and again, and he has  
answered that he is hard at work and will  
not divulge anything until he completes the  
entire apparatus. He has locked up two  
rooms of his shop and refused admittance  
even to his workmen, so that no one but  
himself knows the real condition of affairs.  
Some of the stockholders threatened to call  
a meeting and take the matter in their own  
hands, so far as they could, and, if possible,  
force Mr. Keely to make some public state-  
ment. The directors laid these matters  
before him, and also demanded to know  
when he would be ready and what they  
should say to the irate stockholders. The  
inventor received them and discussed the  
situation. The conference was a secret one,  
and the directors refuse to divulge their  
plans.

### A Floating Coffin Dam.

An ingenious contrivance for the repair of  
vessels without dry-docking them is a float-  
ing coffin dam. At least one of these struc-  
tures is in use at this city, and another has  
recently been built at Boston, where it was  
greatly needed. The arrangement is thus  
described by the Boston Commercial Bul-  
letin:

Its use is in the repair of vessels which are  
damaged either at bow or stern. When it  
is remembered that at least nine-tenths of  
all marine mishaps occur at those points of a  
vessel, it will be seen that its field of useful-  
ness is large. Nearly half of the accidents  
occurring are about the propeller and rudder  
post. Heretofore when such an accident  
was at all serious the repair bill has been  
very burdensome both in direct expense and  
in the delay. Such repairs were necessarily  
made in dry dock, which necessitated the  
shifting and storage of cargo meantime.  
The floating coffin dam is nearly square in  
shape, and is constructed throughout of the  
best hard pine lumber. It is 35 feet long, 32  
feet beam at the gate end, and 28 feet beam  
at the closed end, while its depth is 24 feet.  
It will thus be seen that its construction  
must be sufficient to stand the enormous  
strain of 24-foot head of water. It is flat on  
the bottom and three sides are as square as a  
box. The gate side is built V-shaped half its  
height, while the upper half of the vast in-  
closure is shut in by huge gates, which swing  
on massive hinges and are so arranged as to  
offer no obstruction to a ship's propeller.

The dam is towed alongside the injured  
vessel and sunk at either bow or stern, as the  
case may be. It is then fitted to the vessel  
so that the keel rests upon the bottom  
timbers of the dam and the vessel's sides fit  
into the V-shaped open end. Planking and  
layers of felt are fitted around the vessel,  
which is thus made to form the fourth side  
of the coffin dam. The dam is then pumped  
out, and being relieved of its immense weight  
of water lifts the end of the vessels out of  
the water and leaves the injured portion as  
high and dry for repairs as if it were in a  
dry dock. It has the advantage over a dry  
dock that in cold weather it can be tem-  
porarily roofed over and heated so that it  
will serve all the purposes of a workshop.  
This is an important consideration in the re-  
pair of iron vessels in the winter season.

"A few years ago," says a correspondent  
of the Mechanical World, "a patent was  
taken out for a boiler somewhat resembling  
the Galloway boiler, and when one of the first  
was being examined under test (at the  
maker's yard, I believe) by an experienced in-  
spector, the patentee was much surprised to  
hear from the inspector that an exactly simi-  
lar boiler was made 25 years before, and could  
be still seen at work, but was not a success;  
hence its not having been patented; it no  
doubt lasted a long time by being worked  
easily with clean water, but was not at all  
economical with fuel, while dirty feed-water,  
such as is used in some parts of Lancashire,  
would have made it a dead failure; still, a  
number of these boilers were made and sold  
at a high price. The loud song made about  
corrugated furnaces will no doubt be fresh  
in the ears of your readers as an invention,  
while the writer has seen a perfect corru-  
gated furnace taken out of an old boiler at  
work over 30 years; it was, of course, made  
up of small plates, for the simple reason that  
at that time large plates were not made, but  
it was, nevertheless, a perfect corrugated  
furnace. Three-furnace and out-take boil-  
ers have been tried and found wanting, and  
are now again patented."



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NOW, This, in consideration of the forbearance of the Representatives of the said John Wilson to sue me for damages for the wrong aforesaid, I do hereby undertake and agree,  
FIRST, to surrender and deliver to the Attorneys for the said John Wilson, all knives now on hand, and in my possession, or under my control, bearing the said imitation trade-mark, and  
SECOND, I further undertake and agree to and with the said John Wilson, and his legal representatives, not to manufacture or sell, or cause to be manufactured or sold, at any time in the future, Knives or other Cutlery, bearing his trade-mark aforesaid, or any imitation or simulation thereof. IN WITNESS WHEREOF, I have hereunto set my hand and seal at West Mansfield, aforesaid, this thirty-first day of May, 1883.

WITNESSES:  
E. M. REED,  
(Attorney for Defendant.)

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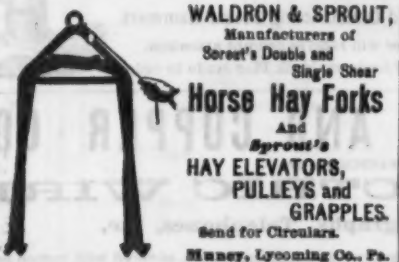
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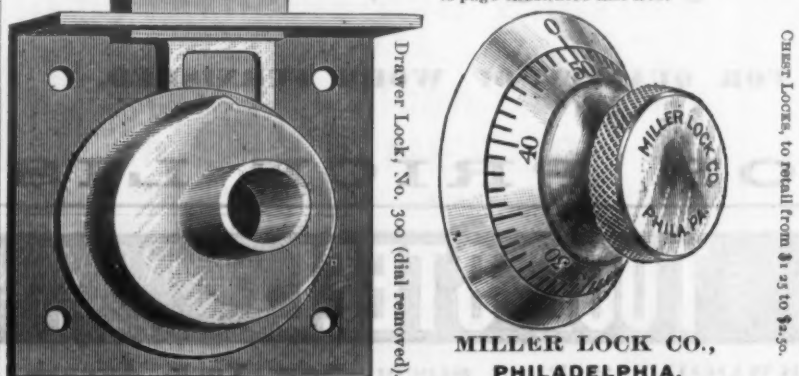
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## The Cholera and Business.

Speculation is already rife concerning the possible prevalence of Asiatic cholera in the United States, the time when its advent may be expected, and to what extent business interests may be affected. Aside from an advance in the price of certain kinds of drugs and disinfectants, the markets as yet show no appreciable influence, and as to the effect upon the grain markets which may be caused by the disturbance of labor in Europe, only the future can determine. United States Consul Mason, at Marseilles, has furnished the Treasury Department at Washington with a valuable statement, somewhat in detail, respecting the origin and character of the disease, obtained from personal observation and official data, from which we extract as follows:

Both Marseilles and Toulon suffered terribly in the cholera epidemic of 1865. During the 19 years which have elapsed since then Marseilles has been, in several important respects, almost rebuilt. Her pavements, her sewerage system, her water supply and method of cleaning streets, removing night soil, inspecting and regulating the markets of food, her quarantine regulations and hospital facilities are all probably unsurpassed in excellence by those of any European or American city. The old quarter of the city, the ancient Marseilles, which was scourged so sharply by the plague in former centuries, has been pierced with broad avenues, streams of pure water flow down the gutters of the narrower streets and alleys, and the pavements of the principal thoroughfares are washed and swept with a care and frequency which leaves nothing to be desired. The terrible lesson of former epidemics has been well learned by the municipal government, and long before the first rumor of trouble at Toulon, Marseilles was cleaned and made ready for the summer heats. But with all the intelligent liberality which the city has evinced in the construction of her drainage system, there is an insurmountable difficulty which all Mediterranean cities are alike compelled to face—their sewers flow into a tideless and generally placid sea. The harbor of Marseilles is almost entirely artificial. The old port is simply the estuary of a small creek, dredged out into a large dock, with a narrow outlet to the sea. The new ports are spacious harbors, inclosed by miles of piers and breakwaters, and deepened to navigable depths by dredging and excavations. Into these inclosed ports, which extend along two-thirds of the shore front of the city, the entire volume of sewage is poured, and as there is only the surplus pure fresh water of the city hydrants to dilute this turbid flow, and as there is no tide to maintain a circulation of sea-water through the inclosed ports, the inevitable result is that the latter grow foul and pestilent. The same conditions, unmitigated by equally vigorous sanitary measures, prevail at Toulon, and it is thought that it was the dredging of a disused dock there during the months of April and May which developed the seeds of the present epidemic. On the other hand—and this is but one of the many curiously contradictory features of this perplexing subject—it is asserted that the old port of Marseilles, the main cesspool of its sewage, was almost entirely exempt from cholera during the epidemic of 1865, but one death having occurred on all the shipping there assembled, and that was of a sailor who came on board his ship at midnight and lay exposed to the night damps and cold of until morning. It is stated in explanation this paradox that the miasma of that particular place acted, upon the homeopathic principle, as an antidote to the venom of the epidemic. But, however this seeming paradox may have been in 1865, the Marseilles government of to-day relies solely upon the most rigid and searching enforcement of recognized sanitary measures.

The dredging of the ports has been stopped and that source of miasma as far as possible abated during the summer. Since the outbreak at Toulon the whole city has been literally washed with water and disinfectants, not once only, but daily and nightly. The markets are carefully inspected and immense quantities of stale and unripe fruit and vegetables seized and destroyed. Railway cars, stations, omnibuses, street cars—even hackney carriages—are fumigated and disinfected and the smell of chlorine, sulphates and carbolic acid is everywhere. Château Pharo, the Imperial palace built by Napoleon III. upon a promontory in front of the city, has been converted into a hospital where all choleraic cases can be isolated and treated. An ambulance corps has been organized which patrols all parts of the city to provide immediate transportation for the stricken to this spacious and airy asylum. Industrial guilds and civic associations have offered their permanent services to the city government to perform, under official direction, the most dangerous and menial services that may be required in treating the epidemic.

Twin-screw engines are just now again being brought to public attention, and a good deal is being said for and against them as compared with the ordinary single-screw system. Failures of cranks and propeller shafts of ocean steamers, and the doubt as to whether a single screw can use up without enormous slip the large horse power developed in many cases, have repeatedly raised this question of relative merits, and definite information on the various points embraced by it and derived from careful comparative tests would prove of the greatest interest and value. It is evident that the larger a shaft the more difficult it is to make it sound, and the more likely is it that it will get out of line, and a division of power, with a consequent division of strain and diminished liability to break, thus naturally and favorably commends itself. Twin-screw engines offer these advantages, and practical experience with them during years past ought to have been sufficient to dispel the obviously erroneous, but still prevalent, impression that they cannot be made to succeed mechanically. Space, cost and weight have been largely instrumental in deciding which system to adopt. Thus it is urged against twin screws that two engines are heavier and more costly than one; that they take up more room, and that they require a larger outlay for attendance, repairs and lubrication. This is all true within cor-

tain limits, but with increasing powers of engines, the great proportion of these items decrease in importance, and in such cases, when compared with the many points in favor of the twin-screw system, may almost be practically ignored. Taken altogether, then, the whole list of objections resolves itself into a question of room only, and while here the twin screw is unquestionably at a disadvantage, the importance of the point has never yet been definitely ascertained, and cannot well be taken as decisive, either in one way or another, until investigation shall have thrown further light on the matter.

## Glass Pulleys.

An account relating to glass pulleys is now being very widely circulated. According to this the pulleys are made in a mold, and have to be very straight and true to the model. They are about 13 inches in diameter and about 2 1/2 or 3 inches wide, with a groove in the center of the rim to receive the cable. Only the rim or tire is of glass, the interior part being occupied by a spider made of iron, which fully supports the glass exterior, and likewise contains the hole for the reception of the axle upon which they run. The thickness of the rim from the surface to where the iron part commences is about 3/4 inch. From experiments already made it has been proven that these glass pulleys will successfully resist any pressure brought to bear upon them; they will reduce friction to a minimum, and they will last an indefinite time. Cables on roads such as those referred to do not always remain on the pulleys, but sometimes, when in operation, are raised up, and upon being released, strike the pulleys with considerable force; even under these adverse circumstances the glass has been tried and found to resist such violence without flaw or fracture, so that all objections to its use have been met and answered.

Glass will cost a little more than metal at first, but in the end will be cheaper. The cables used on traction roads are very expensive, some of them costing from \$100,000 up, so that the saving on these alone will amount to a large sum. The journals or bearings in which the pulleys run will also be of glass, and will need no oil whatever, a point much in their favor, as they are placed in an inaccessible position. This glass is made extra tough and strong, and the pulleys now being manufactured at Pittsburgh are of a blue color, the parties ordering them preferring that tint. They could, however, be made of any other color as well. They take 72 hours to anneal, the average time for ordinary glassware being about 10 hours. Ordinary glass will not do, being too brittle and liable to fracture under sudden impact, and they have to be manufactured with great care. This firm make wheels and other parts of machinery for various purposes of glass. One novelty is a guide over which the silk thread passes in the process of winding in silk mills. The thread runs through a groove in this guide with such rapidity as to wear away iron or steel in a short time, but glass never wears out, and this firm are manufacturing thousands of them for New Jersey, Massachusetts and Connecticut silk mills. They are very small in size, but great numbers are required. The firm have now contracts on hand for cable pulleys alone which will keep them very busy until July, and they are running full force.

## The Russian Naphtha Industry.

An Odessa correspondent of an English paper, speaking of the growth and extent of the Russian naphtha industry, writes: There exist at present in Baku about 400 naphtha springs, sunk by hand to a mean depth of 50 feet, and 400 more, from 300 to 600 feet, mechanically bored. The productiveness of these springs is enormous, and 10,000 poods daily is a low average for a single spring. The flow from many springs is astounding. From July 29 a spring on the estate of the Nobel Company produced in the early days of its eruption 400,000 poods daily, and in the course of some 12 days, until artificially repressed, 8,000,000 poods of oil were taken from this single spring. From another source, struck by the Drushba Company on September 1, the flow for a considerable time reached no less than 500,000 poods a day. There were seas of naphtha, such as America never saw. Besides Baku, Russia possesses extensive oil fields in various parts of the Empire, European and Asiatic, but more especially along the chain of the Caucasus and the adjacent provinces, as in Tiflis, Daghestan, on the Terek and the Kuban, in the Peninsula of Taman, opposite Kertch, in the Island of Svjatoi, &c., all of which yet await further working. If in Baku the higher strata become exhausted, then the Russians, following the example of the Americans, will bore for the deeper strata. Russia is assured of the consumers of Persia and Central Asia. She will send her products over the Caspian and up the Volga, whence the railway will carry them to St. Petersburg, Riga, or Libau, and from there to the consumers of Northern Europe, and by Batoum and the Black Sea to Southern and Western Europe. The distance from Baku to Batoum is about 900 versts. At Baku a black town has sprung into existence, containing some 20,000 inhabitants connected with this industry. Capital is flowing in. In 1882 the freight dispatched over the Caspian was 25,000,000 poods, including 12,000,000 poods of petroleum. During the present year the quantities dispatched by Batoum and the Black Sea are enormous. The finest petroleum may be purchased at Baku, without the barrel, of course, at 25 copecks per pood, or about 1/4 cent per pound.

The Marquette Mining Journal for July 26 says that the previous week's shipments of iron ore from the ports of the Lake Superior district brought the total for the season up to 1,245,784 gross tons, a gain of 367,206 tons over the shipments of 1883 at the corresponding stage. Compared with the shipments for the same period in 1882, the difference in favor of that year is but 136,403 tons, which excess just about balances the earlier opening of the shipping season in 1882.

# The "Emery" Scale and Testing Machine.

The attention of Engineers and all interested in ascertaining accurately and economically the strength of materials is asked to the following letter from the Dominion Bridge Company, which is the most extensive concern in Canada, and one of the largest in America:

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"We remain, yours truly,

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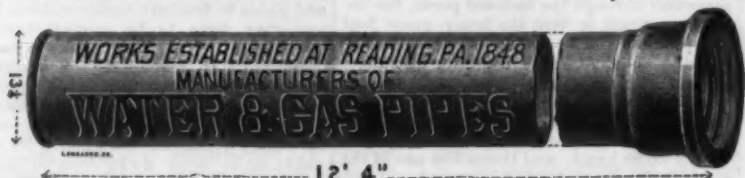
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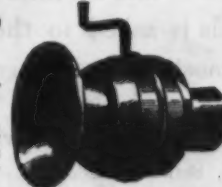


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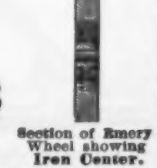
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PARTNERSHIP—EXPENSES AND INTEREST.

In an accounting upon the dissolution of a partnership there was a dispute as to the authority to incur expenses and as to interest. Both parties appealed, and the Supreme Court of Michigan, in deciding the case—Sweeney vs. Neeley—through Judge Sherwood, said: "1. With or without the consent of one partner the other can expend any reasonable amount which he may deem proper in the legitimate prosecution of the copartnership business. 2. Unless it is agreed between partners before dissolution and final settlement neither is chargeable with interest on money he owes to his partner or to the firm arising out of the business transactions of the concern. We do not mean to be understood to say that there may not be equities existing between partners and equitable circumstances existing between partners before final settlement which would raise an implied agreement to pay interest. 3. Interest can never be allowed upon an unsettled or an unliquidated account without an express agreement, or one clearly applied, and the case must be a strong one when it is between partners to warrant its allowance without an express agreement to that effect."

SALE—FRAUD—CHANGE OF POSSESSION.

The purchaser of goods could not pay for them, and he sold them to persons who employed him as a salesman. The vendor attached the goods, claiming that the purchase and sale were fraudulent, and that the employment of the purchaser by his vendee was conclusive evidence of fraud as to the fraudulent sale by him. The trial court decided against the attachment, and the case—Grady vs. Baker—was carried to the Supreme Court of Dakota, where the judgment was affirmed. The Chief Justice (Edgerton), in the opinion, said: "The employment of the vendor by the vendee after a sale may be proved as a fact tending to show that there has been no actual or continued change of possession; but when proved it does not become conclusive of the question, but only an element of proof to be weighed by the jury. After a sale of goods and chattels, and an actual change of possession, the employment of the vendor by the vendee, in the capacity of a clerk or salesman, is not in itself conclusive evidence of fraud which admits of no explanation. After a sale of goods and chattels, and an actual and notorious change of possession, the employment of the vendor by the vendee as a mere clerk or salesman is not a fraud which vitiates the sale, for the change of possession is not continued."

CONTRACT BY LETTER.

A loan was tendered to A, which was to be accepted by letter. The letter was written in a reasonable time, but the trial court instructed the jury so that they found that there was not a sufficient acceptance. The case—Ferrier vs. Stover—was carried to the Supreme Court of Iowa, where the judgment was reversed. Judge Adams, in the opinion, said: "The rule now supported by the great preponderance of authority, and almost, if not quite, universally adhered to, is that when a proposal is accepted by letter the contract is deemed to become complete when the letter is mailed, provided the offer is standing and the acceptance is made within a reasonable time. The contract is deemed complete when the letter is mailed, because the mailing constitutes the overt act by which the acceptance is manifested."

NEGOTIABLE INSTRUMENT.

An action was brought upon a promissory note to which there was a seal opposite to the signature, but there was no reference to the seal in the note. The trial court admitted evidence which was not competent if the note was commercial paper, and the plaintiff failed in his case. He carried it—Brown vs. Jordahl—to the Supreme Court of Minnesota, where the judgment was affirmed. The Chief Justice (Gillfillan), in the opinion, said: "The appellant contends that merely placing upon an instrument a scroll or device, such as the statute allows as a substitute for a common law seal, without any recognition of it as a seal in the body of the instrument, does not make it a sealed instrument. Undoubtedly, where there is a scroll or device upon an instrument there must be something upon the instrument to show that the scroll or device was intended for and used as a seal. But it would be difficult to conceive how the maker of an instrument could better express that a device was intended for a seal more clearly than by the word 'Seal' placed within and made a part of it. The instrument in this case was an instrument under seal, and the defenses were properly set up."

**Deposits of Iron Ore in Brazil.**

The following account of the iron-ore deposits of Minas-Geraes, Brazil, by A. de Bovet, is from an article in the *Annales des Mines*, the translation appearing in a recent issue of the *London Iron Trade Exchange*: "The high and mountainous region which forms the center of the province of Minas is peculiarly rich in mineral deposits. Its diamond fields have long been known as among the most productive in the world, and they are vigorously worked, though the primitive method of extraction is still followed, and the unsystematic conduct of the operations do not lead to the greatest profit obtainable from this source of wealth. The auriferous deposits are both rich and extensive, and these might be made to yield gold in paying quantities under an economical system of working. Some of the richest and most easily accessible of these deposits are in the hands of English companies, chief among which is that of the Saint John del Rey mines. Lead ore, rich in silver, also exists in several places, and graphite plumbago of good quality has been discovered. But less generally known is the fact that enormous deposits of iron ore exist in the district, under conditions that render their working easy and profitable. It is mainly for the purpose of directing the attention of European engineers and capitalists to this promising field for enterprise that the author has collected and made known the facts brought together in this paper."

The iron ores of the province of Minas are remarkable for their extraordinary abundance, their richness and their purity. They are to be found almost everywhere in the center of the province; sometimes in outcrops of enormous extent, often worked into a great depth by the gold miners in search of the precious metal; sometimes deposited in large masses in the bed and upon the banks of rivers, the floods of which carry them away and scatter them over other localities. In many places they constitute the track of the roads, the dust of which sparkles so brilliantly during certain hours of the day that the eye can scarcely bear to look upon it. So abundant is this ore, and so ready to hand, that large quantities of it are used as building stone; this is notably the case in the town of Ouro-Preto. All of these ores belong to the category of oligist iron. Arenaceous oligist iron ore, mixed with a few grains of quartz, and forming a very friable rock, are still worked for gold. A micaceous oligist iron ore, also mixed with quartz in fine grains, and forming a friable rock; a specular iron ore, sometimes found in magnificent crystals; and compact oligist iron ore of very fine grain, and forming an extremely hard and tenacious rock, are other forms of this mineral. The fracture of the latter, where the gangue does not exist, is like that of a bar of steel, except that the color is somewhat darker. There is also a conglomerate covering in a generally thin bed—a large extent of the country at the foot of the oligist iron deposits. This rock is locally known as "canga"; it is clearly formed at the expense of the other deposits, portions of the several rocks of the oligist iron, bound together by a red hematite cement, being easily recognizable in it. This rock is, as a consequence of its mode of formation, full of cavities. Being firm and strong, of the same composition and sensibly of the same richness as the ores whence they were derived, but porous, it seems to constitute an altogether exceptional ore, lending itself completely to the requirements of metallurgy.

All these ores are remarkably pure; they are without a trace of phosphorus or sulphur. The only gangue appears to be quartz, but this does not exceed 5 or 6 per cent., except in the "canga," in which it may be in a little larger proportion. Manganese is always found in these ores, often only as a trace, but sometimes in considerable quantity—as much as 9 per cent. in some samples. These remarkable ores, equal, if not superior, to the best ores of Sweden, Algeria and the Pyrenees, may be had for the labor of picking them up. In some places they crop out from the hill sides, as at Pitangui, for example, where, thanks to the labor of the gold miners, the outcrop of a bed 450 to 600 feet thick may be seen at one view over an extent of several miles. In other places, covering an immense extent of country, occurs the "canga," a superficial deposit the thickness of which is often as great as 25 or 30 feet. Everywhere the streams carry down and deposit pulverulent oligist iron, ready washed for whoever will take the trouble to collect it. Mr. Gorceix estimates the mass of deposits at the foot of the Serra De Caraca at 8,000,000,000 tons. But without such estimates, whoever has traveled through these regions must necessarily have come away with the impression that the deposits are practically inexhaustible.

Unfortunately for this country, so rich in metallic ores, no coal exists in the neighborhood of these deposits. Lignite of good quality is found in several places, and in beds of workable thickness. But this has only a future interest when the industry shall have been sufficiently developed to use the fuel in the gaseous form. But there is an abundance of wood, and wood charcoal must be the fuel employed in the reduction of these iron ores. The extensive forests of the province of Minas are capable of supplying fuel on a large scale for many years to come without the material rising much in value. Hence it will be possible to carry on metallurgical operations for a long time very cheaply by means of wood fuel. It may be added that water-power is abundant and easily utilisable in this mountainous country. At present the means of transport are insufficient, but a railway will shortly be completed up to the boundary of this mineral district, and commercial enterprise only is needed to continue it into the heart of that region.

**A Central American Railroad.**

The completion of the Central American Pacific Railroad from the ocean to Guatemala City—70 miles—was announced July 17 by cable. The road, observes the *Railway Review*, has been built by United States capitalists. It opens railway communication over a hitherto difficult and expensive transit. An elevation of 5000 feet is overcome, passing through some of the most magnificent lake, river, mountain and plain scenery in the world. The capital city has now about 70,000 people, an opera house, several educational institutions, splendid bands of music and a delicious climate. The cities of Amatitlan, 20,000 population; Escuintla, 10,000 population; and Palen, 6000, are passed through on the line. A handsome and remunerative business from there and the smaller villages is assured, as the working of the coast roads, upon which the large traffic heretofore has been carried, has been abandoned. The Government grant a subsidy of \$125,000 annually for 25 years, and no competition is permitted for that term. The enterprise, though encountering great difficulties, has been completed within the time limit, thus securing the lands and subsidies, and will prove very profitable.

The principal capitalists in it are Crocker, Stanford and Huntington, of California, and the Central Pacific, who control it; and Vanderbilt, Morton, Bliss & Co.; De Castro & Co.; Munoz, Butterfield and others, of New York. General Butterfield, who spent the best portion of two years in that country upon the enterprise, incurring fevers that nearly cost him his life, is now slowly recovering from their effects. The capital invested is some \$4,000,000 or \$5,000,000, and will undoubtedly be followed by further and larger investments in that rich and productive region, where sugarcane, coffee, indigo, rubber, balsams, fruits, cochineal, cattle, gold, silver, &c., will yet prove it to be the "Indies," so to speak, of the United States, when the tendencies of the future bring it in closer relations with us. The promised



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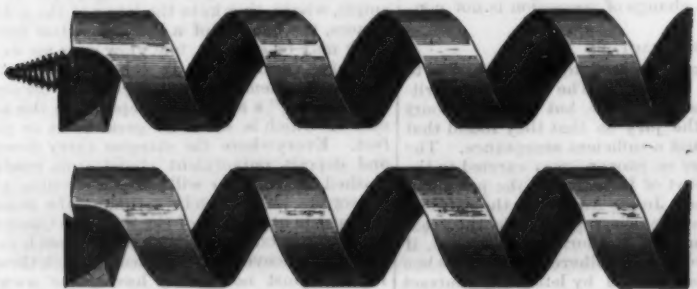
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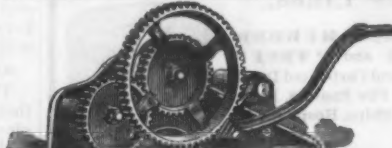
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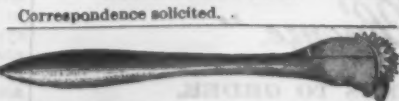
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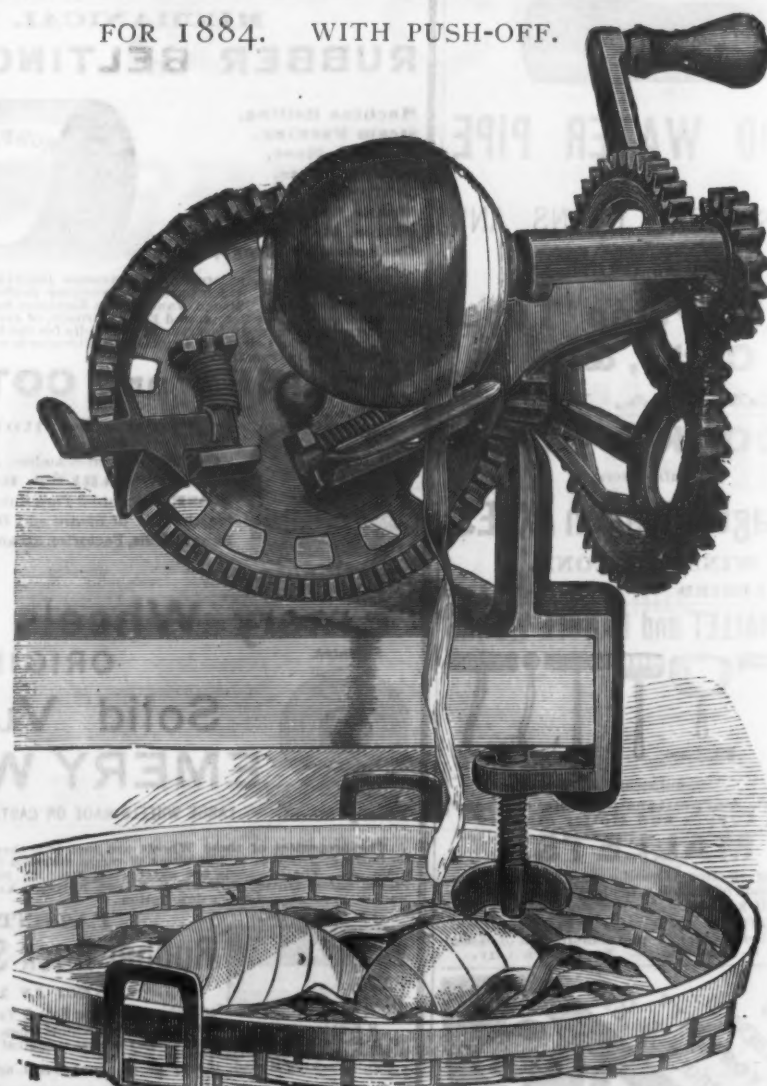
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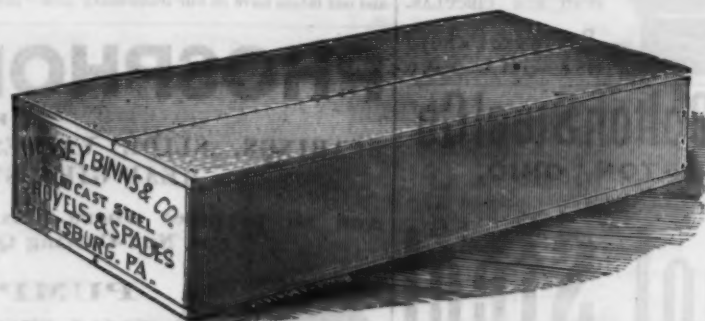
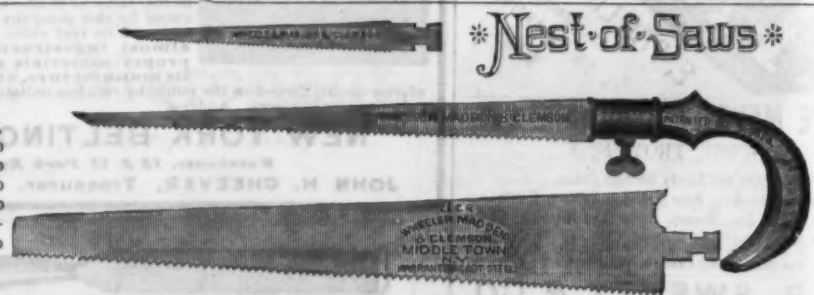


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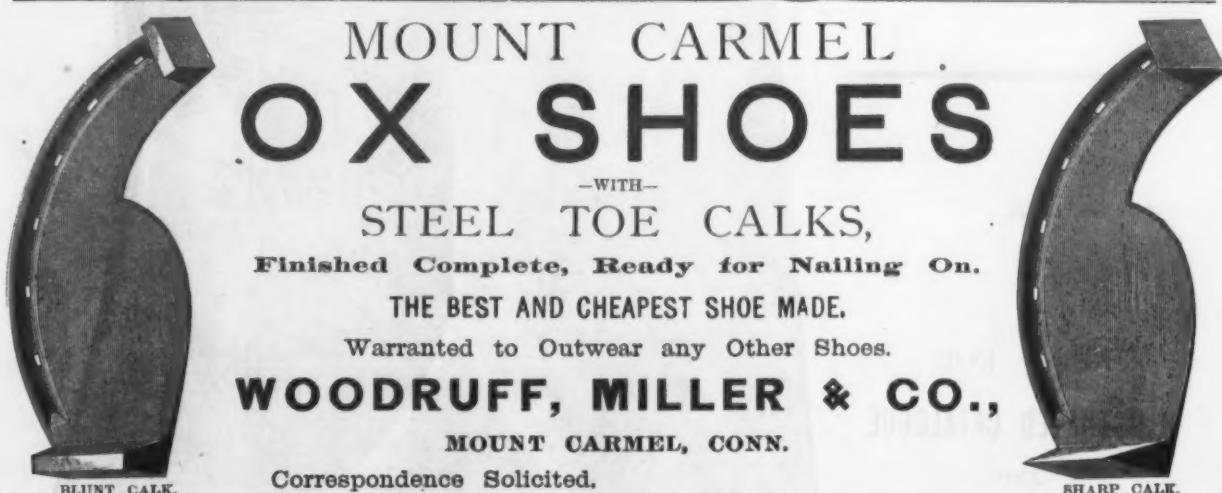
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### He Forgot to Put in the Wires.

Under the above head one or two good stories come from Washington connected with the laying of underground cables there: The Bankers' and Merchants' Telegraph Company in that city are putting their wires underground. A short time ago they made a discovery that was amusing to others, but not to the man having in charge the underground work. He had completed the work for four squares when a thought struck him. He was very sorry that he had not been struck by it before. He had made the underground receptacle for the wires, and covered it over according to the most approved methods, but he had neglected to put in the wires or anything by which they could be pulled through. He tried air pressure and everything he could devise to force a wire through the underground trough. But nothing availed. The whole thing had to be taken up and work done over again. Mr. Morrill Mearns, manager of the Washington office of the Western Union Company, referring to this incident, remarked: "It reminds me of the time they had in London in 1857 or 1858. The telegraph wires in that city have always, for the greater part, been underground. The main wires are laid through the big tunnels, which accommodate also the gas and sewer pipes. These tunnels are big enough for a man to walk through easily. Of course there is no trouble about inspecting the wires or repairing or replacing them whenever it becomes necessary. But the pipes containing the lateral wires, running off for two or three miles from the main line, are small ones. At the time of which I speak one of these lateral wires was hauled out to be repaired. The men doing this work failed to attach to it a leading line, by which the wire could be drawn through again. The means employed to correct the error were very unique. A large rat, with a fine steel wire, was put in the pipe. Behind there was thrust a ferret. The rat ran from the ferret a short distance and stopped. It was feared that he would show fight and be killed. But he started on again. He ran through the whole length of the pipe and brought out the wire in good style, though closely pushed by the ferret."

### Shipbuilding in Sweden and Norway.

It is a singular fact that Sweden and Norway are now the only countries in the world that are increasing their sailing fleet. While steamers in every other country are supplanting sailing vessels year by year, in the Scandinavian merchant navy steam is almost at a standstill, and sailing vessels are steadily built and navigated at a profit. The Swedish Government shipping statistics, just published, are interesting in connection with this matter, and from these we gather the following particulars:

The total number of vessels of all kinds, and their capacity, from 1830 to 1881 (the latest date to which the statistics apply) are shown in the table below:

	Vessels.	Capacity, tons.
1830.....	1,841	133,446
1840.....	2,171	162,323
1850.....	2,744	209,187
1860.....	3,320	256,733
1870.....	3,376	246,992
1880.....	4,339	342,642
1881.....	4,151	329,613

The number of Swedish vessels engaged in trade abroad from 1877 to 1881 were:

	Sailing vessels.	Tonnage.	Steamers.	Tonnage.	Horse-power.
1877.....	1,815	371,145	167	56,973	11,039
1878.....	1,850	382,254	160	55,373	11,407
1879.....	1,908	382,742	173	55,969	11,476
1880.....	1,968	400,542	165	55,089	11,333
1881.....	1,907	400,608	162	55,945	11,310

These vessels earned in 1881—the sailing vessels 33,957,148 crowns, and the steamers 11,906,000—altogether, 45,863,148 crowns, or, at 27 cents, \$12,383,050 of our money. In British trade 11,850,924 crowns were earned; in French, 4,604,756, and in German trade 3,747,846. In our own trade with foreign countries the Scandinavian flag participates largely. The sums of money remitted home by Swedish consuls alone for account of sailors in 10 years have ranged as under:

	Crowns.		Crowns.
1872.....	32,296	1877.....	67,675
1873.....	48,960	1878.....	81,753
1874.....	57,500	1879.....	86,307
1875.....	71,500	1880.....	80,017
1876.....	85,751	1881.....	84,049

Including captains, the Swedish merchant navy was manned in 1881 by 23,622 men. Scandinavian vessels and their captains have an excellent reputation abroad, and no better navigators than these men sail the seas.

In order to account for the fact that the building and navigation of sailing vessels is even to-day a prosperous business in Sweden and Norway, and on the increase, we have only to consider the abundance of suitable timber down to the water's edge all along the extensive Swedish and Norwegian coasts, Atlantic and Baltic, which from time immemorial has singled out Scandinavia for shipbuilding, and that capital is more easily procurable for this industry there than anywhere else. Vessels are built on small shares and navigated by captains who have an interest in them. The Swedish tariff, moreover, is so managed that it does not

interfere with the most economical building of vessels possible. As Scandinavia trade with the outside world is not large enough to employ even 20 per cent. of all the seagoing vessels under the Swedish and Norwegian flags, international trade has become the great field for these vessels, built so cheaply and so economically and well navigated that no other flag seems to be capable of competing with these vessels in the long run. At any rate, whatever may take place with the merchant marines of other nations in the change from sail to steam, Scandinavia forms an exception and proves that even sailing vessels will pay in competition with steamers if those building and running them know how to avail themselves of the natural and other advantages at command.

### Capt. John Ericsson.

Captain Ericsson, who designed the famous Monitor, is not only still living, but is as hard at work as ever. On the 31st ult., he completed his 81st year. A reporter of the New York Herald says of him:

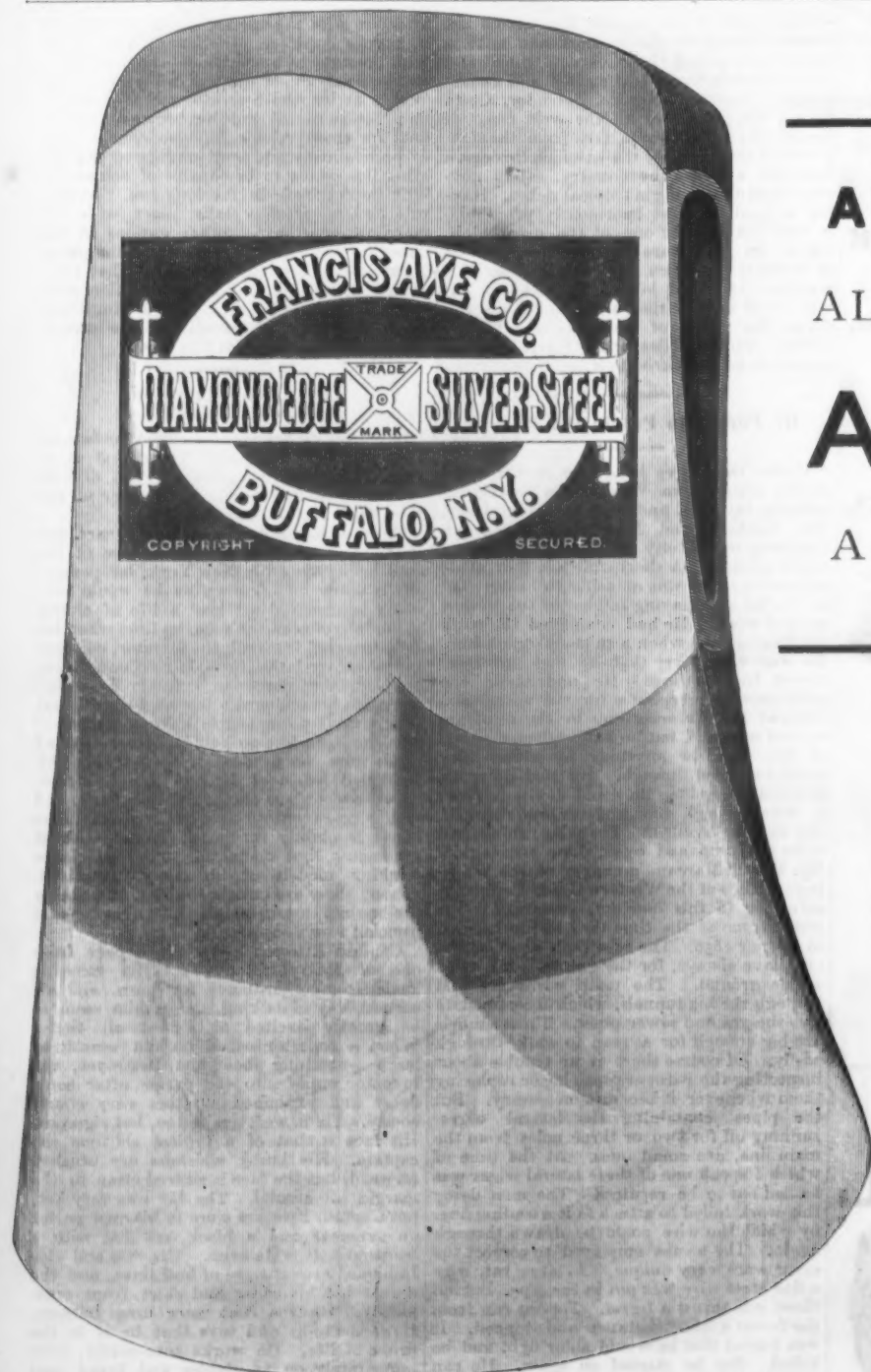
He is, as he has been for many years, one of the most eccentric as well as one of the most brilliant men in New York, but personally is not as well known as he would certainly be if he did not lead a life of almost absolute seclusion. From the time when his little turreted ironclad, the Monitor, engaged and destroyed the formidable Confederate ironclad, the Merrimac, Captain Ericsson's name has been almost a household word, but comparatively few people have a notion of what he looks like or how he lives. Buried in his work, he spends his time in his old-fashioned house at No. 36 Beach street, opposite what was once St. John's Park, and seldom goes out or receives visitors. The house is plainly furnished, almost without ornaments, but containing numerous large working models of his many inventions. Among these are calorific engines, the steam fire-engine, astronomical instruments and ironclad war vessels.

Captain Ericsson looks like a page from one of Marryatt's novels. His voice is louder than an ordinary fog horn, and his earnest way of talking makes him seem to be greatly excited at almost all times. When a reporter called on him recently to learn something about the Destroyer, the inventor came into the parlor after some delay and explained matters very courteously. He is weather-beaten, but vigorous. His face is that of a typical old-time sea captain. His bushy whiskers are brushed forward, but the face is shaved clean to the margin all around. The day was very hot, but Captain Ericsson wore in his own parlor an overcoat and a black silk hat with a tremendously wide brim. His vest and old-fashioned cravat were of buff linen, and the cravat hid his collar and shirt front completely. On the coat were brass buttons. He seems to be and says that he is in the prime of life. He works incessantly, lives temperately on vegetables and bread, and practices strictly regular habits. So far as indications go he is likely to work for 30 or 40 years longer. His latest perfected work is the Destroyer, which he claims will demolish any other ironclad vessel afloat. He is now engaged in solar observations by which he proposes to prove beyond question that Sir Isaac Newton was right in his calculations when he asserted that the temperature at the sun's surface was several millions of degrees Fahrenheit.

**The Proposed Spanish-American Treaty.**—The condition of the negotiations for a commercial treaty between Spain and the United States is shown in the following cable dispatch from London, under date of the 29th ult.: In Madrid the opposition to the proposed commercial treaty between Spain and the United States is increasing among the leading members of the Cabinet. It is not yet publicly known just what transpired Saturday during the long interview between Señor Canovas Del Castillo, the Prime Minister, and Mr. Foster, the American minister. It is stated, however, that the result of the interview has been highly unsatisfactory to Mr. Foster. It is certain that the opposition against the treaty, which had been held in check pending this conference, has now broken out afresh and with increased vigor. Señor Canovas, who was understood to have been strongly in favor of the treaty, is now opposed to it, although he maintains a lukewarm support. Señor J. Eduyayen, the Minister of Foreign Affairs, has placed himself at the head of the opposition and is doing all in his power to thwart the efforts of Mr. Foster. Señor Eduyayen vehemently warns the Spanish Government that if the proposed commercial facilities are accorded to the United States Spanish interests in the Cuban trade will soon perish entirely.

**Eastern Glass-Blowers' Wages.**—The Philadelphia North American states that at a meeting held on the 29th ult. at the St. Cloud Hotel, between the glass manufacturers of New Jersey and Eastern Pennsylvania and their employees, for the purpose of arranging the scale of wages for the coming year, a compromise was effected by which the men will receive an advance of 5 per cent. over last year's scale. They demanded an increase of 10 per cent. for blowers, and nearly the whole day was spent before a compromise was effected. Another paper states that the men asked also that gatherers be given 2½ per cent. for carrying out the rolls, and that the manufacturers agree to run their blasts through 10 months. These demands were acceded to. This result gives to the blowers 5 per cent. increase over the wages of last year. The gatherers, who were paid 65 per cent. of whatever the blowers made, will now receive 2½ per cent. additional if they carry out the rolls. The flatteners, who received 25 per cent. of what is made by the blowers, will have the same percentage. Cutters, who received 25 cents per 100 feet single strength, and 36 cents for double strength, will now get 26 and 40 cents respectively. Mr. Cline says that the wages of all the glass-workers in the United States have been satisfactorily adjusted. He also says that under the new arrangement glass-blowers of the Eastern district will receive 10 per cent. less than the blowers of Pittsburgh.





ALL STEEL  
ALL POLISHED  
**AXES**  
A SPECIALTY.



SEND FOR  
ILLUSTRATED CATALOGUE  
AND  
PRICE LIST.



**MICHIGAN. REGULAR.**  
**AXES, HATCHETS, FRANCIS AXE CO., Buffalo, N. Y. PICKS, MATTOCKS.**

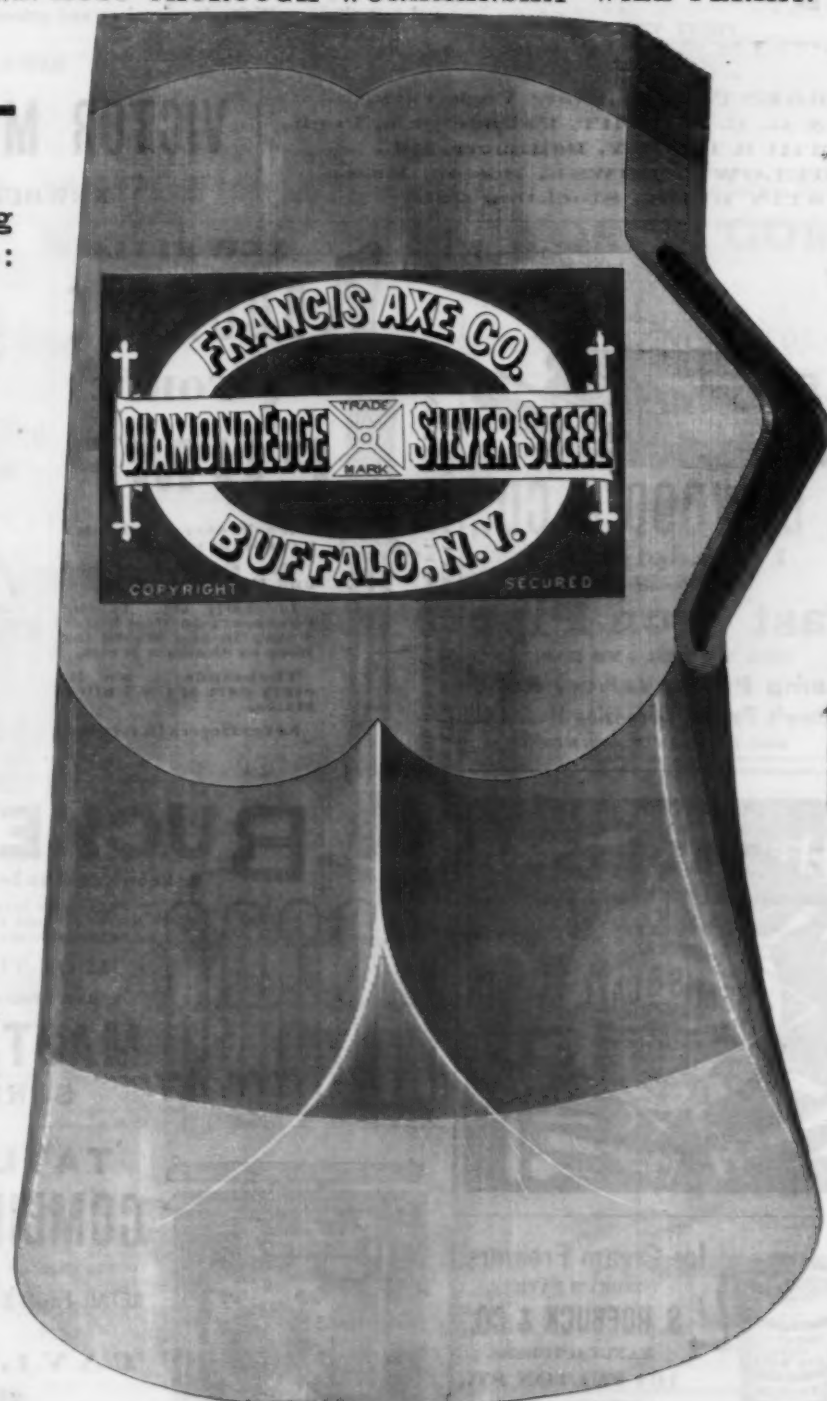
PRICES AS LOW AS THE EXCLUSIVE USE OF THE BEST MATERIAL AND MOST THOROUGH WORKMANSHIP WILL PERMIT.



**WESTERN BEVELED.**

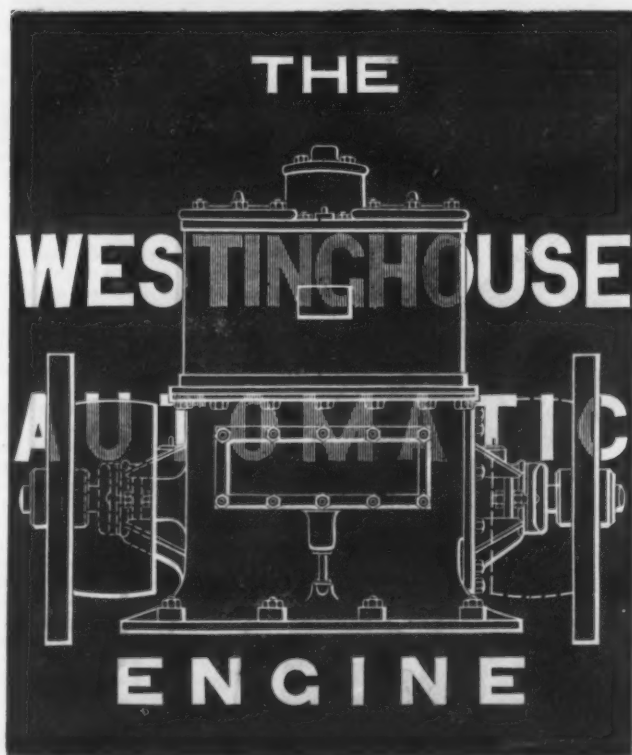
Orders sent to the following  
Agents will receive attention:

T. P. Burke,  
*100 Chambers St., New York.*  
Parkinson & Gillett,  
*Minneapolis, Minn.*  
C. W. Mott,  
*Milwaukee, Wis.*  
Teague, Barnett & Co.,  
*Montgomery, Ala.*  
Gordon Hardware Co.,  
*San Francisco, Cal.*  
Bigelow & Dowse,  
*Boston, Mass.*  
Witte Hardware Co.,  
*St. Louis, Mo.*  
Weaver & Goss,  
*Rochester, N. Y.*  
Pratt & Co.,  
*Buffalo, N. Y.*  
Everson & Friselle,  
*Syracuse, N. Y.*



**KENTUCKY.**





## THE WESTINGHOUSE MACHINE COMPANY, PITTSBURGH, PA.

SALES ROOMS.—44 Liberty St., New York; 401 College St., Charlotte, N. C.; 401 Elm St., Dallas, Texas; 53 South Market St., Nashville, Tenn.; Fairbanks, Morse & Co., Chicago, Cleveland, Cincinnati, Louisville and St. Paul; Fairbanks & Co., St. Louis, Indianapolis and Denver.

THE HARRINGTON & KING PERFORATING CO., Main Office and Works, Nos. 48 to 51 S. Jefferson Street, Chicago.



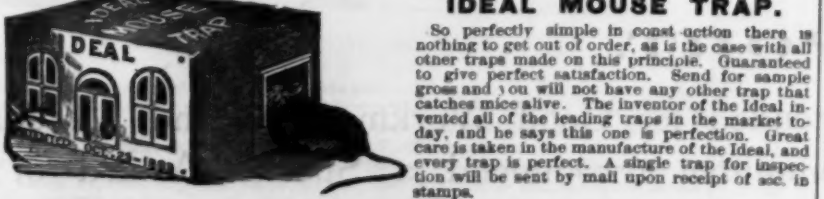
## PERFORATED SHEET METALS

FOR ALL KINDS OF GRAIN CLEANING MACHINERY in any size and for all uses. REVOLVING SCREENS of every description made to order. STAMP HATCHES a specialty.

PERFORATED TIN & BRASS  
Of all sizes for FILTERS, STRAINERS, VENTILATORS, &c., &c.  
Iron, Steel, Copper, Brass and Zinc Punched to any size and thickness required.  
Branch Office, 100 Beekman St., New York.

## The F. F. ADAMS COMPANY, Erie, Pa.

THE LATEST THING OUT.



The Cyclone Mouse Trap.

We invite the attention of dealers to this "Novelty" in Mouse Traps. Patented Nov. 6, 1883, and now having an immense sale. It is cheap, durable and attractive, and so sensitive that the mouse who ventures to touch his nose to the bait box is doomed. Our salesmen on the road say it is the most popular trap ever offered to the trade. One of our men in a single short trip sold 15,000. The retail price is only 10 cents each, and yet they afford big profits to the dealer. We will send a sample by mail for inspection, upon receipt of five 5-cent stamps. Send for our Illustrated Catalogue.

## J. M. SCHOONMAKER.

MANUFACTURER AND SHIPPER OF

## CONNELLSVILLE COKE

Capacity of Mines, 2500 Tons Daily.

Siding connections with all lines of Railroads.

Office, 120 Water Street, PITTSBURGH, PA.

## SHIELDS & BROWN,

78 and 80 Lake St., Chicago, Ill.

MANUFACTURERS AND SOLE PROPRIETORS OF



FOR BOILERS AND STEAM PIPES. Reduces condensation of STEAM.

## ROLLING MILL TOOLS.

Roll-Turning Tools, Roll-Turning Plugs.

Also

Shear Knives, Circular and Straight, made from SPECIAL STEEL.

S. Tretheway, 49th Street Tool Works, Pittsburgh.

## INDUSTRIAL ITEMS.

### CONNECTICUT.

A large machine shop and foundry belonging to Barnum, Richardson & Co., of Lime Rock, were burned last Sunday morning. Total loss, \$85,000; insured for \$60,000. The firm will rebuild at once.

### MASSACHUSETTS.

The New England Awl and Needle Factory, West Medway, has started up after the customary suspension of two weeks to make necessary repairs.

Some of the largest stand-pipes in this country have been built by the Cunningham Iron Works, of Charlestown. Specimens of their work can be found at Athens, Ga.; Wyandotte, Kan.; Alliance, Ohio, and numerous points in Massachusetts and other Eastern States. In 1879 they erected the great stand-pipe for the high-service pumping station at Ninety-eighth street, New York, which is 157 feet high.

### NEW YORK.

The great girder which is to sustain the roof of the new Real Estate Exchange, in New York City, is 45 feet long, 5 feet high, weighs 20 tons, cost \$5250, and is intended to stand a strain of 250 tons. It will carry the whole of the western wall of the Marquand Building, in Liberty street.

On the 4th inst the Post Office Department awarded to the Hall Safe and Lock Company, of New York, a contract for supplying 27 fire and burglar proof safes for post offices in different sections of the country, at a cost of \$11,163.

The Buffalo Forge Company, whose products are found in the shops of this country from Maine to California, are proving their present prosperity and their faith in the future by building an addition 75 x 185 feet—doubling their present capacity.

### PENNSYLVANIA.

The charcoal furnace at Jefferson, near Auburn, Schuylkill County, owned by Hon. J. M. Kaufman, was blown out on the 28th ult., to make repairs that have been contemplated for some time. He expects to be able to resume work in a month or six weeks.

The recent fire at the open-hearth steel works of the Cambria Iron Company, Johnstown, did not necessitate any loss of time, as a temporary hoist was put up at once and used. A new hoist is in process of construction.

A puddling furnace in the rolling mill of the E. & G. Brooke Iron Company, at Birdsboro', recently exploded, doing considerable damage to the mill, but injuring no one. It is rumored that the whole works are shortly to be shut down for repairs—not, of course, at all on account of the accident, which was of comparatively little consequence.

The pipe mill of the Reading Iron Works has been closed for an indefinite period.

The new addition to the Union Foundry and Machine Works, Catawauque, has been completed, and an upright engine and large lathe erected and drill arranged for properly dressing the immense columns now in process of manufacture for the Philadelphia Gas Works. By the new addition considerable labor and time are saved, and the regular work of the machine shop is not interfered with, obviating night work and greatly facilitating the operations of the company. A new building for the storage of sand is also being erected.

The bar and guide mill of the Allentown Rolling Mill Company, which was idle last week, resumed work Tuesday morning. About 75 men are employed.

George H. Anderson, the assignee of A. O. Tinsman, offered the Mount Braddock Coke Works for sale at the court house at Uniontown, Fayette County, on last Friday, but, receiving a bid of only \$1300, adjourned until August 8.

The coke operators along the Baltimore and Ohio Railroad between Mt. Pleasant and Broadford were seriously troubled during last week on account of the water. Some of the ovens have been almost flooded.

A general reduction of 10 per cent. in the wages of the employees of the Scranton Steel Company went into effect on August 1.

Titusville is to have new steel and iron works, the Eames Petroleum Iron Works plant having been purchased by Burgess, Garrett & Co. It is not their intention to manufacture the ordinary grades of iron and steel, but special grades of both. They will also make a self-hardening steel equal in quality to the celebrated Mushet steel. This iron and steel is all made by an entirely new process, which is a secret with Mr. Burgess. The company will rearrange the plant at the Eames Iron Works, increase the furnace capacity, and add a large quantity of new machinery. Work will be commenced immediately, but it will require a month or six weeks and a large expenditure to put the works in condition for business.

### PITTSBURGH AND VICINITY.

About 3,000,000 bushels of coal went out on the rise last week in the rivers—an extraordinarily large run for this season of the year.

The United Coal and Coke Company have had their charter amended, which changes their place of business from Philadelphia to Pittsburgh.

The notices given to a large number of employees at the Westinghouse Air Brake Works, in Allegheny, that their services would not be required after Saturday, August 2, created considerable excitement, and has caused much speculation as to the reason. The explanation is very simple, and does not mean that business is dull at all. The number of men who quit Saturday is 175, according to Superintendent West, and not 235. The company had a contract with the Central Pacific and Union Pacific railroads to furnish a very large number of brakes for freight cars. The works were turning out 30 sets per day of brake fixtures, but the railroad companies desired the contract completed more rapidly, and the output was increased to 80 sets per day. This large contract has been completed, and, there being no

other large contracts that are pressing, 175 of the new men have been dropped. It includes machinists, molders and laborers in about the usual proportions. The regular force of 450 men is retained, and will be kept at work as usual, and if more large contracts come in that are urgent the discharged men will be re-employed.

Singer, Nimick & Co. will have completed by October 1 an addition to their works, to be used for rolling thin gauges of steel for special purposes.

The stove molders' strike continues. De Haven & Co. have been having considerable trouble in endeavoring to run their works non-union, from the interference of union men with their employees. They have had to apply for police protection, and have had two of the strikers arrested for pointing weapons.

### VIRGINIA.

Low Moor Furnace, at Low Moor, Allegheny County, made 22,726 tons of pig iron from January 1 to July 19, 1884, an average production of about 812 tons per week. The largest product was 873 tons for the week ending July 19, and the least was 701 tons the second week in January.

Victoria Furnace, near Goshen, is now being relined and will go into blast about September 1. A large force is now at work in the mines that supply this furnace, so that it will commence operations with a large stock of ore on hand, which will be needed in view of the increased capacity for production the refitted furnace will have.—The Virginian.

The temporary embarrassment of the operators of the Gem Furnace, at Milnes, has been relieved, and work was resumed at the furnace on last Monday. President Milnes made an address to the men last Thursday, frankly stating that, owing to the failure of companies in the North, and the consequent unsettled condition of the money market, that he had been unable to get money to pay them off, but if they were willing to trust him he would say that if they would go to work he would sell the iron and appropriate every cent of it to the payment of their dues. Every man promptly and cheerfully accepted the proposition and went to work last Monday, as above stated. We learn that there is an abundance of ore already mined and at the furnace to last several months, which will make iron enough to pay all obligations due by the company for labor. Our informant states that the company are confident that their troubles will be fully passed by the 20th of August, and that then work will be regularly resumed.—Pittsburgh Courier.

### NORTH CAROLINA.

The North Carolina Car Company, of Raleigh, are constructing the Exposition Building for the fair to be held at that city in October. The building will cover 71,000 square feet, and they will use 600,000 feet of lumber in its construction. The company are enlarging their capacity for constructing cars, &c. They use Goodell & Waters' car machinery, of Philadelphia.

### TENNESSEE.

Gen. J. T. Wilder, of Chattanooga, informs us that the report to the effect that he contemplates building a blast furnace at Bristol is untrue. He has no intention of building a furnace anywhere.

Merriwether & Hatch, of Clarksville, contemplate the removal of their plow factory to Nashville. They are organizing a company for the purpose of securing more capital to enable them to carry on a very extensive business.

### ALABAMA.

The Victoria Burnam Grate Company have decided to erect their foundry at Birmingham. The necessary ground, 100 x 160 feet, was donated by Dr. Caldwell, of that city, and lies contiguous to the works of the Birmingham Rolling Mill Company and Sloss Furnaces.

### OHIO.

The Jefferson Iron Works, of Steubenville, on July 29 began to manufacture a trial lot of steel nails, buying the steel blooms in Pittsburgh. Three hundred and fifty kegs were made as an experiment, which was entirely successful, the nails being cut as easily as iron, and were smooth and perfect. If there is a demand, the company will manufacture steel as well as iron nails. The boiler department of the works has shut down for repairs, which will include alterations to the heating furnaces, to permit the use of natural gas.

All departments of the Trumbull Iron Company, Girard, were to start up this week. A large warehouse has been built alongside of the mill.

The mill structure of the Kelly Nail Works, at Ironton, is up and the repairs to the boilers are going on. It is expected that the mill and factory will be running next week.

The forge department of the Belfont Iron Works Company, at Ironton, has been put in operation, and the plate mill and nail factory will resume in a week or two.

The Manning Novelty Company, of Youngstown, are experiencing a large demand for their specialties, and contemplate the erection of a large building in a short time for their own use.

The Pierce Manufacturing Company will commence the operation of the evaporator works in Warren early in August.

The Akron Sewer Pipe Company were recently awarded a \$20,320 contract by the Commissioners of the District of Columbia.

The Buckeye Engine Company, Salem, have orders ahead for 19 engines, none less than 125 horse-power.

All the rolling mills of Youngstown, with the exception of those of Brown, Bonnell & Co., are running to nearly their full capacity.

### ILLINOIS.

Chas. F. Elmes, of Chicago, has just secured an order for the construction of 20 additional Harrison coal-mining machines.

It is intended to have the works of the United States Rolling Stock Company, at Hegewisch, in operation for building freight cars by the close of the year. All the tools

and machinery constituting the equipment have been purchased and are to be delivered in October. Fifteen hundred men will be employed.

Next month the Bergen Tool Company, of Batavia, will bring out some new and improved bolt machinery. Their works are now being run on full time.

The rolling mill at LaGrange was attached on July 27 by George Bartlett, of LaGrange, to secure a coal bill for \$400. The mill is owned by the McKinney Tubular Rail Company, of Chicago, who secured a deed for the property from the LaGrange authorities about three weeks ago.

The building, recently completed, of the Morden Frog and Crossing Company, at South Chicago, is 300 feet long and 100 feet wide.

The South Chicago Dock Company contemplate the erection of mammoth warehouses for the accommodation of the wholesale grocery and heavy hardware trade of the city. The plans are not yet settled upon, but it is the intention to make the arrangements for storage and shipping as complete as possible.

### MISSOURI.

The Laclede Mills, of Chouteau, Harrison & Valle, which shut down last week for repairs, will probably remain idle until about September.

The St. Louis Saw Works are restarting after a two or three weeks' stoppage, during which time a new furnace was put in and necessary repairs on plant made.

But four of the 17 blast furnaces of Missouri are at present in blast.

The St. Louis Stamping Company are erecting a 40 x 180 feet addition to their Granite Iron Rolling Mills, to which, when completed, will be removed their galvanizing works, which are now located at their down town factory. The rolling mills are at present shut down.

### MICHIGAN.

The Leonard Glass Works, of Detroit, shut down on July 5 for repairs to the furnace, and also to enlarge their capacity for handling glass insulators.

**Activity in Russian Sheet-Iron Mills.**  
—It is reported from Russia that the sheet-iron mills are doing a brisk home business, which is ascribed to the increased Russian tariff telling against the importation of English iron of inferior qualities. The Russian sheet-iron industry is a very old one, the mines and works of Prince Demidoff having a long historical record. The most celebrated, however, of the Russian polished sheet iron is that from the Jaccaloff Works. There are two works bearing this name. "Within the last decade," says the *British Trade Journal*, "the price of Russian iron in America has declined almost 50 per cent., and it is a remarkable fact that, though several of the largest English merchants have commissioned the leading English, Belgian, Westphalian and Swedish mills to make an imitation Russian iron, none have ever succeeded, and to American genius the credit of making an excellent imitation article is alone due. It is stated that the process of giving it its gloss in the works in the Ural Mountains, Russia, is a secret. Whether this is really so remains to be seen. An interested English firm once made an inquiry to this effect at headquarters, and received the laconic reply, 'The lustrous surface is due to elbow-grease.'"

**An Unusual Wages Claim.**—We take the following statement from the *Philadelphia Record* for August 1: The iron sidewheel steamship, *Heroe*, Captain Hudson, built by the American Shipbuilding Company for Pedro Scandella, of Ciudad, Venezuela, was seized yesterday by United States Marshal McMullin, of Delaware, on a writ of libel, issued at the instance of the crew, to recover full wages under the claim that the vessel is unseaworthy. She left for Ciudad via Port of Spain, Trinidad, on July 6, and after leaving the Delaware Capes followed the Gulf Stream for more than a week, when the captain put back by reason of the imperfect action of the vessel's machinery, which slipped to and fro with the motion of the ship. She put into Cape May for repairs and finally reached Delaware City, where she was libeled. On Thursday night of last week, while the vessel was proceeding up the Delaware Bay, the entire crew were nearly blown up by an explosion of the boilers, resulting from an insufficient supply of water. The action of the crew is based on the provisions of a statute which allows wages for a full voyage upon a vessel becoming unseaworthy, even though the port of destination has not been reached.

It is said that West Australia, with 30,766 inhabitants and an area of 1,000,000 square miles, has 92½ miles of railroad, or 1 mile to 333 people. But it does not support its roads—one 24 and one 12 miles long—owned by companies and engaged in carrying timber to the coast, which may be presumed to earn some profit, else they would not be worked; but neither of the roads owned by the Government has earned its working expenses. South Australia, which extends entirely across the continent from the south to the north coast, with the enormous area of 935,000 square miles, has a population of 310,650, which is 311 per mile of railroad. The expenditure on railroads per inhabitant was £20 12s. (\$103), the average cost per mile of the 945½ miles at the end of 1882 having been £6520 (\$32,600). Small as it was, however, the net earnings were but 2.56 per cent. on this capital, and the balance had to be made up by taxation. Several of the roads did not earn their working expenses.

Compared with the Vendôme column in Paris, the Bartholdi statue is higher by a few feet. Compared with the largest other statue of which the height is known, it is twice as high, the statue in question being that of St. Charles Borromeo, on the banks of Lake Maggiore. The height of the Colossus of Rhodes is supposed to have been 120 feet, or 30 feet less than the height of Bartholdi's work.



GOLD MEDAL.

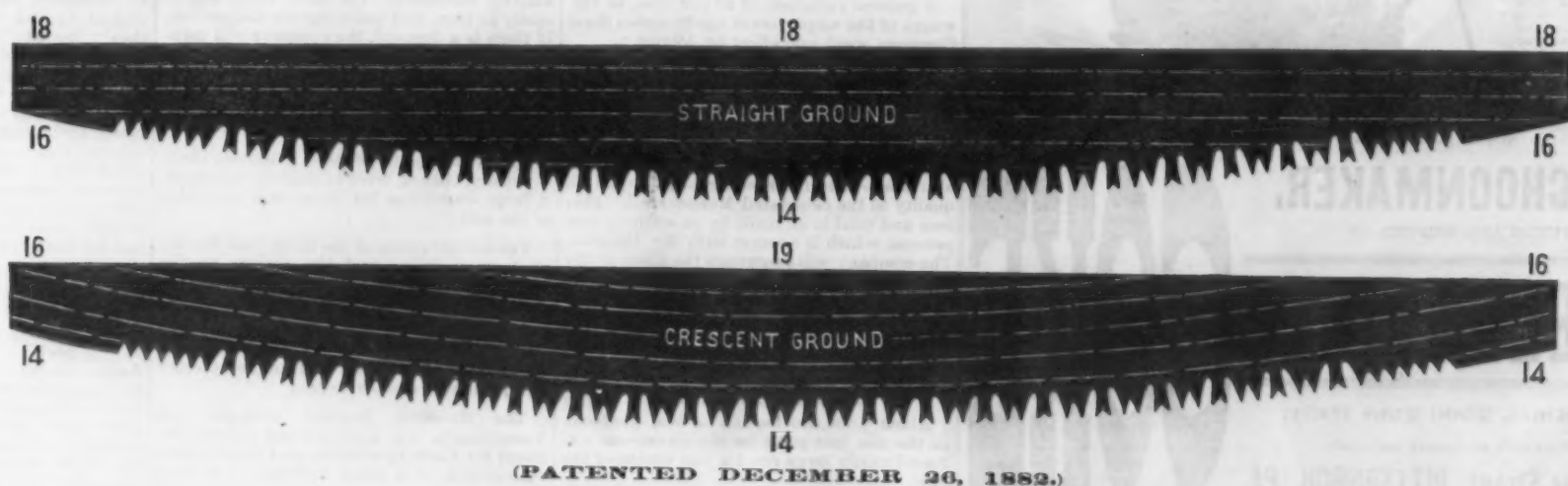


GOLD MEDAL.

Only Gold Medal Awarded on Saws.

**JUDGES' REPORT.**

Best Display of Solid Tooth Circular Mill Saws. Recommended for Good Workmanship and Material, Superior Temper and Method of Tempering. And the Committee recommend a Special Award of a GOLD MEDAL.



We guarantee that the Crescent-Ground Cross-Cut Saws will cut 10 per cent. more timber, same labor being used, than any other brand of Saws made; and we warrant the temper unequalled in quality and uniformity.

# SIMONDS MANUF'G CO.,

FITCHBURG, MASS.

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### Wale's Portable Dynamometer.

The Electrical Supply Company, of No. 117 Dey street, New York, have placed upon the market a new portable dynamometer, the design of Mr. George Wale, of Jersey City, N. J. This apparatus offers to the expert a reliable means of measuring power transmitted by a belt by attaching directly to the latter an instrument whose use requires neither the unlacing of the belts nor the loosening of the pulley on the shaft. The horse-power transmitted is measured by the trace of a pencil upon a paper-covered drum, thus securing an accurate and permanent record of all variations of power during intervals of not less than an hour at high belt speeds. Each minute of time is also recorded by electrical attachments belonging to the apparatus.

The accompanying cut shows the manner of mounting the instrument, the only supports needed being pieces of 1½-inch steam pipe. The apparatus consists of two rolling pulleys A A, that swing upon pivots C C, which are supported in castings D D. The latter slide upon the rod E, so that by means of the chain F and winding-drum G the pulleys A A may be drawn together, deflecting the belt and forming the angles  $\phi$  and  $\beta$ . These angles being made equal in adjusting the instrument, the tension of the belt, when the latter is at rest, is the same on either side and causes equal pressure on each of the rolling pulleys, tending to force them apart, but being prevented from so doing by the tie-rod O.

When motion occurs in the direction of arrow No. 1, any transmission of power causes an increase of tension along the upper side of the belt, as designated in the cut, and a decrease of tension along the lower side, the difference of tension thus caused between the sides of the belt forcing the rolling pulleys and the rod O to swing about the pivots C C in the direction of arrow No. 2. The latter action causes the arm H to move out of parallelism with the arm I, to which is fastened the bracket N, and thus the spring L is expanded until its resistance counteracts the pressure on A A, due to the difference of belt tension. The movement of N causes the pencil X to move outward upon the paper drum J; the latter is given a continuous

and the spring at its furthest position on the arm H.

This extraordinary range of capacity is due in a measure to the influence of the belt angles, though principally due to the fact that the movement of the spring effects the pencil scale as the square of the distance of the spring from the center of the rolling pulleys.

The vibrations of the pencil usually so inseparable from autographic power registers is overcome by using a flexible brass wire for a tracer. The point of the wire is pressed upon chemical paper with a friction sufficient to cause the vibrations to expend themselves in the flexure of the wire without displacing the point, while any permanent displacement of the wire is immediately responded to by a movement of the point of the tracer. A rigorous test of this instrument was recently made at Stevens Institute, Hoboken, N. J., with very good results.

### The Distribution of Steam in Cities.

In a paper contributed by Mr. W. A. Goodyear, on "Water Gas as Fuel," read at the Boston meeting (February, 1883), of the American Institute of Mining Engineers, the following statement was made: "The latest experiments on a scale of some magnitude in our cities, in the way of heating buildings and furnishing power for manufacturing purposes, have been by the distribution of high-pressure steam through pipes laid in the streets. But these experiments (1) have not hitherto been very successful; and when we consider the high cost and (2) the great and unavoidable loss of heat and power which always accompanies the conveyance of high-pressure steam to any considerable distance in pipes, to say nothing of (3) certain practical difficulties in the management of the pipes themselves, (4) it is evident that all such methods must eventually disappear before a system which can furnish cheap gas of great heating power, easily distributed wherever wanted, without requiring pipes to stand pressures of 50 to 75 pounds per square inch, and (5) without keeping the whole mass of ground in the streets through which it passes hot, gratis, for a distance of 10 or 15 feet in all direc-

which are laid from 5 to 9 feet below the surface, do not radiate heat fast enough to melt the snow in ordinary winter weather any sooner over their location than it is melted elsewhere in the street by atmospheric influences alone. It is no answer to this to say that the street steam-pipes laid elsewhere or by others do melt the snow. That only indicates carelessness, cheap or improper construction. Where mineral wool is used freely as an insulating covering to the pipes, excessive radiation of heat does not occur.

The system of steam distribution invented by Birdsell Holly, M. E., has been in successful operation in Lockport, N. Y., for heating only, for seven years. The company have 4½ miles of mains, six 75-horse-power boilers, and supply over 200 consumers. During the first four years it was operated without meters at a loss. When meters were adopted three boilers were sufficient to supply the customers who formerly required the steam from six. The

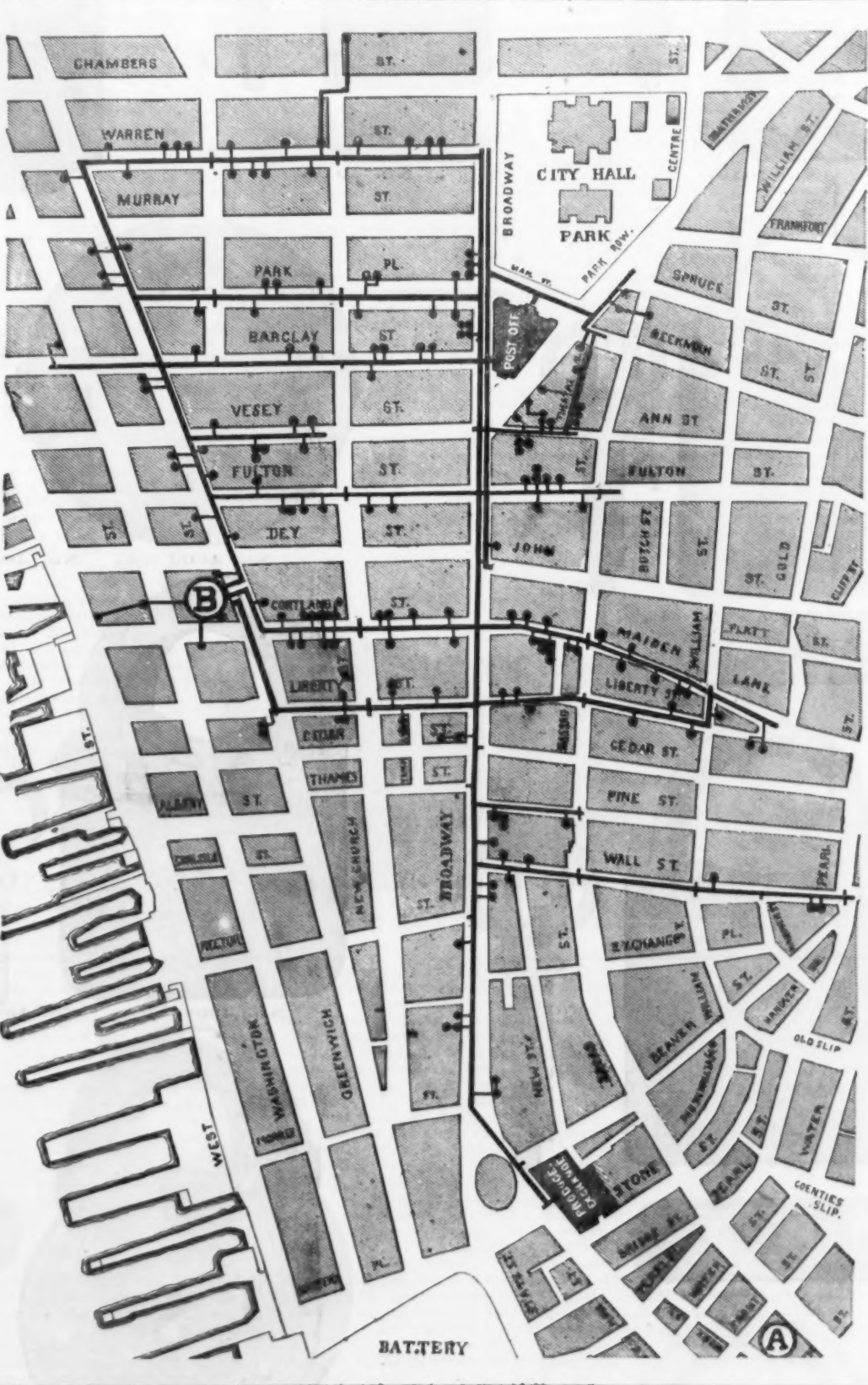
company carry 60 pounds pressure, and supply 150 consumers, principally for heating. The plant was poorly constructed upon plans designed to evade the Holley patents, and has not been profitable, but is paying expenses and improving in its results.

In Lynn, Mass., a "duplex system" was put in operation in February, 1881, and was run until July, 1883. This plant had a high-pressure main in which 70 pounds pressure was carried, and a low-pressure main carrying 20 pounds, the former being used for power and the latter for heating. I personally examined this plant in October, 1881, and again in June, 1882, and found it working successfully and giving great satisfaction to its customers for power, the only ones then using the steam. The plant was poorly constructed, the boiler-house was badly located, and the company failed financially, and in July, 1883, the plant was sold to a company, to be used for the distribution of water-gas. It has been so used during the heating season just ending, with a less favor-

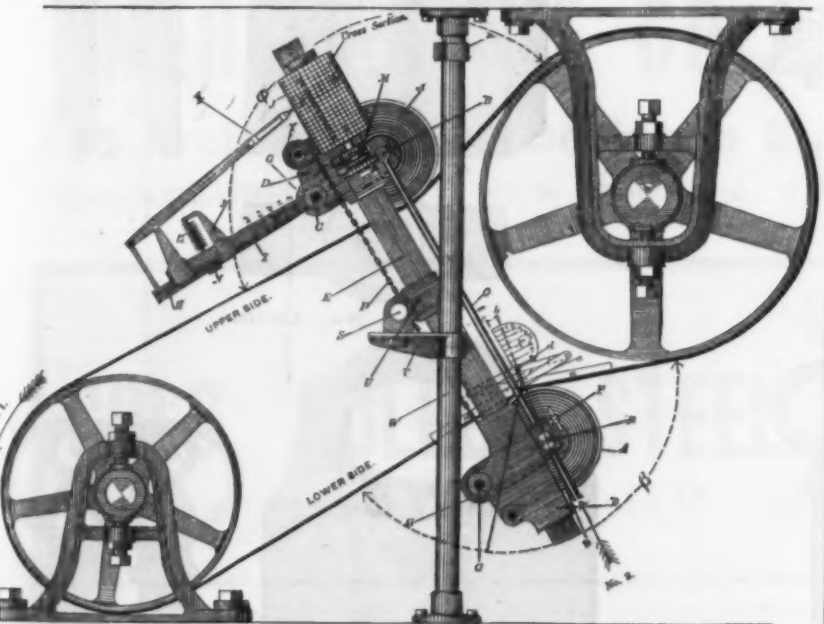
there are on the first floor four, on the second floor 12 and on the third floor 15. The fourth floor contains the coal-bins, the coal being hoisted in cars, upon a platform hoist and descending in chutes to the floor, alongside each boiler. The building is designed to be six stories or 120 feet in height above the basement, and is to contain 64 boilers of 250 horse-power each, 16 on each of four floors, the fifth and sixth stories to be in one, to contain Green's economizers, and storage for 1000 tons of coal.

The total capacity of the station will be 16,000 horse-power, requiring a daily consumption of 600 to 750 tons of anthracite coal. Draft will be furnished by two chimneys, each 27 feet 10 inches by 8 feet 4 inches interior section, and 217 feet high above the basement floor.

The grant to the company covers the right to lay their pipes in "every street, alley and public place" in the City of New York, which contains over 250 miles of paved streets, and the company now own the property for



DISTRIBUTION OF STEAM IN CITIES.—MAP SHOWING THE LOCATION OF THE MAINS AND SERVICES OF THE NEW YORK STEAM COMPANY.



WALE'S PORTABLE DYNAMOMETER.

motion of rotation by means of a train of differential gearing, M, driven from the arbor of one rolling pulley. The combined motion of the pencil and paper results in the tracing of a line, the height of which above the lower edge of the paper representing the force transmitted by the belt, and the length, the length of belt passing over A A during the experiment. An inch height of pencil will represent different amounts of belt tension, according to the value of the angles  $\phi$  and  $\beta$ , and also according to the distance from C of the spring, the latter being arranged to slide to four positions along H and I; consequently, by a proper selection of value for the belt angle and position of the spring, the pencil can be made to move through its maximum height for any amount of power measured.

Attached to the apparatus is a gauge specially adapted to the measurement of the belt angle. The gauge is shown applied to the belt at a d e in the accompanying cut. Its graduations are made to represent the ratio of the tension along the belt to the component of the tension acting along the line joining the centers of the rolling pulley.

There are two methods of measuring belt speed: 1. By timing revolutions of primary gear wheel. The primary wheel of the gearing giving motion to the paper drum is graduated to serve as a speed counter, each revolution of this wheel representing 100 revolutions of the rolling pulleys A A. The circumference of the latter for single belting is exactly 2 feet; hence each revolution of primary wheel in gearing represents 200 feet of belt travel. 2. By measuring the length of differential gearing. The differential gearing is arranged to cause 122,500 revolutions of the rolling pulleys per one turn of paper drum, and the circumference of the latter is 12½ inches; consequently, each inch of length of a diagram parallel to base line represents 20,000 feet of belt travel.

The electric time attachment consists of a telegraph sounder carrying a pencil which bears against the paper, and which is caused to mark a stroke once a minute by the passage through a mercury cup of the hand of a minute clock, placed in a battery circuit leading to the electric sounder. The scale of the diagram may be varied so that an inch of pencil motion may represent 0.094 horse-power at 1000 feet per minute, or 50 times this amount.

The maximum rise of the pencil is 5 inches. Hence, at 1000 feet of belt speed 5 inches of pencil movement could be produced by 0.470 horse-power, with a belt angle of 120° and the spring close to the rolling pulley, or 5 inches pencil motion could control 23½ horse-power (nearly) with very flat belt

tions around the pipes." For the purpose of controverting Mr. Goodyear's statements in regard to steam distribution in cities, Mr. William P. Shinn read a paper bearing the above title, at the Chicago meeting of the Institute, and in which he numbered the points made in the indictment, his object being not a professional discussion of the technical and theoretical merits of steam vs. water-gas, but a simple statement of facts in regard to the present state of the street system of steam distribution. Taking Mr. Goodyear's points in their order, Mr. Shinn remarks:

1. Concerning what he terms "these experiments," saying that they "have not hitherto been very successful," I propose to show that the problem of steam distribution has passed beyond the experimental stage, and that its practical solution is highly successful. This will be shown by the facts hereinafter fully set forth.

2. "The great and unavoidable loss of heat and power which always accompany the conveyance of high-pressure steam to any considerable distance in pipes" is no longer a correct statement of facts. The New York Steam Company are now carrying steam in 5 miles of mains, ending at points from one-half to five-eighths of a mile from the boiler-house. Careful investigation shows that with a pressure of 75 to 85 pounds at the boiler-house the loss of pressure at the ends of the pipes averages 2 pounds, while a carefully conducted series of experiments upon the loss by condensation places it in a mile of pipe at 5 per cent. of the capacity of the pipe. This means that, if a system of any number of miles does not extend beyond a mile from the boilers, the loss will not exceed 5 per cent. on the capacity of the main.

3. The "certain practical difficulties in the management of the pipes themselves," I suppose to refer to their expansion and contraction. These difficulties have been so successfully overcome by the expansion joint invented by Mr. Chas. E. Emery, engineer of the New York Steam Company, that they give no trouble whatever.

4. "It is evident that all such methods must eventually disappear," &c. What may "eventually" occur, he would be a bold man who would either affirm or deny; suffice it to say what is: that steam distribution is at present extending faster and yielding better and more practical results than "water-gas as fuel."

5. "Without keeping the whole mass of ground \* \* \* hot, gratis, for a distance 10 or 15 feet," &c. That this inference is not warranted is shown by the fact that the pipes of the New York Steam Company, this

capital of the company is \$50,000, and they are earning net 20 to 25 per cent. per annum. The largest main is 4 inches in diameter, and the pressure carried is 30 to 35 pounds.

In Springfield, Mass., the system has been in use for five winters, for heating only. The company have 2¼ miles of mains and eight 75-horse-power boilers. The pressure carried is 20 to 40 pounds. The company have 195 consumers, and on an investment of \$50,000, have earned net 12 to 15 per cent. per annum, since the second year. The steam is sold by meter, and readings are taken weekly.

In Dubuque, Iowa, the system has been in operation for five winters, with 2¼ miles of mains, and seven 50-horse-power boilers. The company are supplying 250 horse-power of steam to 140 consumers for heating purposes only. The plant was constructed too cheaply, and has not been a financial success. It is now earning a small surplus, and consumers are all delighted with the service.

In Denver, Col., the system has been in use during four years, for only heating. The company have nearly 3 miles of 8, 6, 4 and 3 inch mains, and 15 50-horse-power boilers, supplying 150 consumers. Upon an investment of \$150,000, the company earned net, during the season of 1882-83, \$7863, or 5¼ per cent., and the net savings for the season of 1883-84 were estimated at \$10,000, or 6½ per cent.

In Hartford, Conn., a steam plant has been in operation during four seasons, with nearly 3 miles of 6-inch, 4-inch and 3-inch mains and 20 80-horse-power boilers. This

able result than was reached by the steam company. In New Haven, Conn., a company have been in operation for two seasons, with about 2 miles of 8-inch, 6-inch, 5-inch and 4-inch mains, and 10 75-horse-power boilers. The plant was constructed on the "duplex plan," and during the first season furnished both power and heat, but during the past season it has furnished 500 horse-power of steam to 80 consumers for heating only. The financial results have been bad, the earnings having failed to pay expenses, principally on account of bad management.

In Troy, N. Y., and Detroit, Mich., steam plants have been in operation from three to four years, but I have no definite information as to their results.

In Milwaukee, Wis., a plant was constructed and operated during two winters, but, owing to faulty construction and still worse management, it was a financial failure, and it has not been in operation during the last two seasons.

The New York Steam Company, after two years spent in making plans and trying experiments in expansion joints and in non-conducting materials, began building their first boiler station in the summer of 1881, and commenced laying street mains in September 1881.

The company now have their boiler station (B) on Greenwich street, above Cortlandt, in this city (a building 75 x 100 feet on the ground, with a basement and three stories complete, and the fourth story covered by a temporary roof), containing 31 Babcock & Wilcox 250-horse-power boilers, of which

10 boiler stations, distributed on both sides of the city, from near the foot of Broad street to Fifty-sixth street.

The map herewith given shows the city from Chambers street to the Battery Park, and upon it are indicated in black lines the mains now laid, while the black dots show the locations of buildings in which steam is furnished by the company. The point A is to be the site of a second boiler station, while B indicates the boiler station now in operation.

The system of mains consists of a steam main of 6 inches to 16 inches diameter, and return water-main of 2½ to 8 inches diameter, the former laid between brick walls and surrounded by 6 inches to 12 inches of mineral wool, and the latter laid in hollow logs, with a space of 3 inches around the pipes, also filled with mineral wool. The pipes are laid with an anchorage every 90 to 100 feet, and a double expansion joint midway between the anchorages, or with an anchorage and single expansion joint every 45 to 50 feet. The expansion joint is of the diaphragm style, invented by Mr. Emery for this company's use. The mains now laid are as follows:

Steam-mains. Feet.	Return Water-mains. Feet.
Of 16 inches..... 746	Of 8 inches..... 5,067
" 12 "..... 9,984	" 6 "..... 1,135
" 10 "..... 4,147	" 4 "..... 11,900
" 8 "..... 1,991	" 3½ "..... 8,900
" 6 "..... 5,802	
Total..... 33,352	Total..... 21,902

Or 4.42 miles of steam-mains, and 4.14 miles of return-mains—in all, 8.56 miles of



# EAGLE LOCK CO.

Manufactories at Terryville, Conn., and Geneva, Ohio.

Salesroom at No. 98 Chambers St., New York, U. S. A.



No. 4019.



No. 4017.



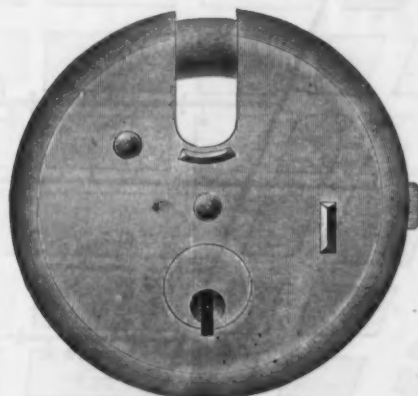
No. 4000.



No. 4007.



No. 4021.



No. 4002 (Iron).



No. 4003 (Brass).



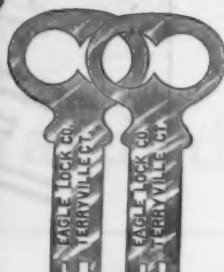
No. 4006.



No. 4043.



No. 4008 (Brass).



No. 4009 (Iron).



No. 4005.



No. 4047.



No. 4011.



No. 4004.



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# "Gilbertson's Old Method."

EXTRA QUALITY  
CHARCOAL ROOFING PLATE.

**G**UARANTEED to contain 19 pounds of Metal on the IC 14 x 20 and 38 pounds on the IC 20 x 28. This Plate we believe to be equal in all respects to M. F. Roofing, and, if not found so, it can be held subject to our order. This certainly is all the guarantee required as to our belief in its merits. One of the most reliable houses writes us it is "equal to M. F. in all respects." We leave it to other customers to judge for themselves, and solicit correspondence as to prices, &c. We do not detract from the value of the M. F. when we state that the "Gilbertson's Old Method" is as good and will be sold by us at a much lower price.

## "THE SPENCER."

### BRIGHT CHARCOAL TIN PLATE.

We have just received 10 x 14, 12 x 12, 14 x 20, 20 x 28, from IC to IXXXX, of the above brand. The Makers have supplied us with the finest Plate they could make, having had no limit made by us as to price. The Plates present a handsome appearance, and are heavily coated, and, in our opinion, no finer Plate can be made by any Maker. Prices will be made as low as possible on application. Try a sample box, and, if not not satisfactory, same can be held subject to our order.

## MERCHANT & CO.,

525 Arch St., 90 Beekman St.,  
PHILADELPHIA, PA. NEW YORK, N. Y.

## COLD ROLLED STEEL.

The Gautier Steel Department of Cambria Iron Co., Johnstown, Pa., has the only steel mill in America properly equipped with special machinery for making Cold Rolled Steel. It is guaranteed, when necessary, not to vary more than one one-thousandth of an inch from true round, and is all hand-straightened and perfectly free from kinks or bends. Superior to Cold Rolled Iron in every respect, as the following comparative tests show:

Material.	Elastic limit. Lbs. per square inch.	Ultimate strength. Lbs. per square inch.
Cold Rolled Iron.	49,660	69,010
" " "	49,610	67,140
Cold Rolled Steel.	76,950	111,500
" " "	79,210	110,890

From the above it will be seen that the elastic limit of Gautier Cold Rolled Steel is greater than the ultimate strength of Cold Rolled Iron, while the ultimate strength of Cold Rolled Steel is nearly 62 per cent. above that of Iron. All Sizes of rounds, from 1/4 to 3 inches, of standard lengths kept constantly in stock for prompt shipment, out to any lengths desired. The surface is bright, and sizes are so accurate that no lathe work is necessary. Samples furnished upon application.

## GAUTIER STEEL DEPT.

CAMBRIA IRON CO.,

Johnstown, Pa.

NEW YORK OFFICE:  
104 Nassau St.

PHILADELPHIA OFFICE:  
523 Arch St.

[No. 80.]

pipes, exclusive of service-pipes. The most distant point to which steam is now delivered is 3350 feet from the boiler station, and the other extremities are 3187, 3133, 3044, 2973, 2920, 2880, 2625, 2261 and 2077 feet respectively from the boiler station. The pressure carried is 75 to 85 pounds at the boiler station, and carefully conducted tests show the pressure at the extreme points to be from 1 1/2 to 2 pounds less than at the boiler station.

The company have been furnishing, during March, 1884, 4156 horse-power of steam to consumers, of which 1985 horse-power was for power and 2171 horse-power for heating and other purposes. Among the consumers now supplied are:

The Produce Exchange, new building.  
The Mutual Life Insurance Company, new building.  
The New York Tribune.  
The New York Commercial Advertiser.  
The New York World.  
The Iron Age.  
United Bank Building.  
Smith & McNeill, restaurant.

All of these, excepting the two first named, formerly had their own boilers, and now take their entire steam supply from this company.

Engines are being run of from 1 to 150 horse-power, and the supply of steam is regular, constant and satisfactory.

The amount of capital actually invested in the Station B and its street system is \$1,086,320.79, of which only one-half the capacity is at present being utilized; but the operations are now on a paying basis, the net earnings being at the rate of \$20,000 per annum, or about 2 per cent. of the cost, and this in the second year of operation. When Station B is operated at its full capacity, much greater economy will be realized, and its net earnings are expected to be 15 to 20 per cent. on the amount of the investment in that part of the company's system.

### The Hotchkiss Mechanical Boiler Cleaner.

A short time since we submitted to our readers an illustration and description of what was claimed to be a new water purifier and boiler cleaner, brought out by Mr. E. W. Van Duzen, of Cincinnati, Ohio. Closer inspection, however, will show that it embodies all the essential features of the Hotchkiss mechanical boiler cleaner, which has been in successful practical operation for a number of years past, the only difference, if we may consider it as such, being in the sediment collector, which, instead of having a spherical form, as that used by Mr. Hotchkiss, is cylindrical, and contains a number of perforated partitions so arranged as to compel the circulating water to pass over a large settling surface. The principles involved in both appliances are exactly alike, being the circulation of the water in the boiler through a system of pipes and a mud collector, the latter being furnished with a suitable blow-off pipe, and under these circumstances it is questionable whether Mr. Van Duzen's apparatus is justly entitled to the privilege of being considered new or in any way different from that which is now so well and favorably known. In order to present the matter more clearly to our readers, we append herewith an engraving showing Mr. Hotchkiss's apparatus applied to a boiler, from which a good idea may be obtained of its arrangement and method of working. It is a well-known fact that, as soon as the water in a steam boiler becomes heated, currents are established. These currents are formed by the hotter, and therefore lighter, water flowing upward and away from the source of the greatest heat, while the colder, and consequently more dense, water flows to the source of heat to replace the other, and in its turn become heated. In all boilers, when heat is applied at one end, the currents established will be upward and from the fire on the surface and downward and toward the fire in the lower part of the boiler. Mr. Hotchkiss has made use of this in his cleaner, which, as shown in the illustration, consists essentially of a large spherical reservoir, B, connected with a funnel, C, by means of an up-flow pipe, D, and to a lower part of the boiler by the return-pipe E. Circulation thus takes place from and through the funnel C, up the pipe D, then into the reservoir and from there back into the boiler through the pipe E. The funnel C is set in the boiler on the low-water line, as shown, and is made of the best charcoal iron. The mouth or opening measures about 12 x 15 inches, and will fit into an ordinary manhole, or, should the hole be too small, the funnel may be bent so as to enter and afterward be brought back to its original shape. The reservoir B is a cast-iron spherical vessel with a capacity of about 18 gallons. It is 7/8 inch thick and weighs about 215 pounds. When in position, with the pipes attached, it occupies a space of from 28 to 30 inches in length, 24 inches wide and 26 inches high, and being a solid casting, without joints and spherical in shape, it is capable of standing an immense pressure. Each one is tested with steam to 150 pounds per square inch before being sent out. The funnel being in proper position the hot water at the surface will enter it and flow into the reservoir, displacing constantly an equal quantity of the cooler water therein, which, flowing back to the boiler by the return-pipe, reaches a lower and cooler strata of water than that entering the funnel. Thus a steady and constant circulation of water through the cleaner is maintained so long as firing is kept up. This circulation is continuous and automatic, and by its certain and natural action all the water in the boiler passes successively through the reservoir, where, being kept still and free from agitating currents in the boiler, the most favorable conditions are insured for the precipitation and deposit of sediment. The latter, once deposited in the reservoir, is removed through the blow-off pipe F as often as necessary. Every one familiar

with steam boilers is aware that deposits and incrustations naturally seek the quietest part of the boiler, and the office of Mr. Hotchkiss's apparatus is therefore simply to provide a place for their accumulation outside of the boiler itself, and removed from heat and its agitating effects, whence they can be readily removed as fast as they accumulate, instead of shutting down the water to clean them out by hand or blowing out the boiler in the ordinary way, thus losing a large amount of water already heated to the steaming point. It is not claimed for the Hotchkiss cleaner that it will remove scale bodily from boilers when the scale is already formed, but it is claimed for it and guaranteed that it will prevent the formation of new scale by removing all the flowing deposits and mineral salts which become scale if not removed from the water before they have had time to adhere to the heating surfaces. By preventing the formation of new scale the old deposits, by expansion and contraction of the heating surfaces, soon become loose and readily detached.

The Hotchkiss cleaner was first brought out in 1875, and since that time its merits have become extensively recognized, so that now a very large number are in use throughout the country.

### OBITUARY.

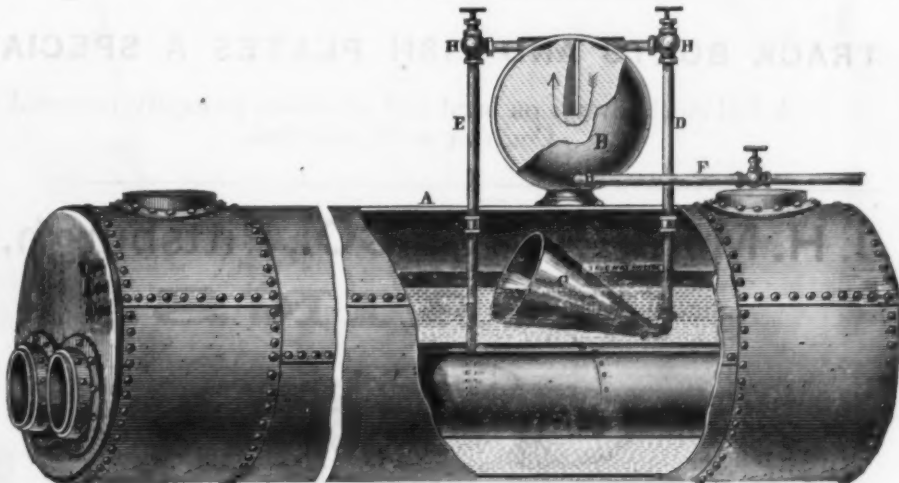
THOMAS DICKSON.

Thomas Dickson, president of the Delaware and Hudson Canal Company, and prominently connected with the coal and iron interests of the country, died at his summer home in Morristown, N. J., on the 31st ult. Although he had been sick at times with a complication of diseases for several months past, his last attack had confined him to his home for less than a week. Within the last two weeks he attended to business in this city.

The career of Thomas Dickson is a notable illustration of the opportunities offered in America for an advance from the humblest conditions of life to wealth, influence and high position. Beginning his business life as a boy mule-driver in the mines of Pennsylvania, he ended it as president of one of the largest coal producing and transporting

and John, Joseph A. Scranton, B. G. Clarke, J. J. Albright and Joseph Benjamin. The company originally contented itself with the manufacture of stationary engines and machinery intended for use in the mines around Scranton, but its prosperity increased under its founder's progressive management, and to-day it has a capital of \$1,500,000 and employs about 800 men. Mr. Dickson was president and manager of the company up to January 1, 1860, when he was succeeded by his brother, George L., his son-in-law, Henry M. Bois, now being the president. It was with the Delaware and Hudson Canal Company, however, that Thomas Dickson secured the bulk of his fortune, and it was under his management that the company took the high rank it now holds among the anthracite coal companies of the East. Not until after he had become its president did it acquire its present railroad system. Mr. Dickson entered the employ of the Canal Company in 1860 as superintendent of the coal department, and four years later he was promoted to be general superintendent of all its business. In 1867 he was chosen vice-president and in 1869 he was elected president. When he was general superintendent the corporation was of far less magnitude than it is now. Its only railroad was a gravity road from Carbondale to Olyphant, near Scranton, together with a branch to Scranton, the total mileage being only 63. Its roads simply furnished connection between the mines and the canal by which the coal product was carried to tidewater. The company's annual output was only about 500,000 tons, and passengers were carried from Carbondale to Scranton by stage. At the present time the company produces from 4,000,000 to 5,000,000 tons a year and owns or leases 149 miles of road in Pennsylvania and about 600 miles in New York.

Mr. Dickson held large interests in important iron-mining properties. He was the first capitalist to recognize the importance of the ore deposits along Lake Champlain and to secure their development. When he died he was a director of and heavily interested in the Crown Point Iron Company, organized in 1872; the Chateaugay Ore and Iron Company, incorporated in 1875, and the Hudson River Ore and Iron Company, organized in 1881. Mr. Dickson was also interested in the Low Moor Iron Company, of Virginia; the Lackawanna Iron and Coal Com-



THE HOTCHKISS MECHANICAL BOILER CLEANER.

panies in the country. He sprang from the sturdy Presbyterian stock which has been the bone and sinew of Scotland. His father, James Dickson, was the son of a soldier who served for 20 years in the 92d Highland Regiment; he was early apprenticed as a millwright in Greenlaw, Scotland, and afterward was a master millwright. The first of his six children, Thomas Dickson, was born at Lauder, Berwickshire, Scotland, on March 26, 1822. His parents removed, with their family, to Canada in 1832, where for two years his father followed his trade in Toronto. In 1834 the Dickson family removed to Susquehanna County, Pa., where James Dickson worked with his brother-in-law, George Dinen, at the latter's farm near Dundaff. Agriculture was not to his taste, however, and he soon abandoned it to enter the service of the Delaware and Hudson Canal Company as mechanic, subsequently becoming master mechanic of the company, a position he retained until his death, on May 6, 1880. It was here that Thomas received his schooling, but at the age of 13, having had a quarrel with his schoolmaster (the only one in the neighborhood), he decided to earn his own living. George A. Whiting then had charge of the horses and mules of the company used in connection with the coal-mining operations, and he hired young Dickson as one of the boys who rode the mules. Years afterward Mr. Dickson was wont to tell with gusto that he was the first boy who ever went on strike in the coal regions. His wages then were 10 cents a day and he demanded 12 cents, a sum which was granted after only a day's idleness. In 1838 Thomas entered the country store of Charles T. Pierson, at Carbondale, as clerk. The next year Pierson sold out to Joseph Benjamin, young Dickson being transferred with the stock. In 1843 he was again transferred with the store and business to F. B. Grow and Edwin Grow, brothers of Galusha A. Grow. While clerk for Joseph Benjamin young Dickson had won the favor of his employer by his energy, faithfulness and honorable character. The two went into partnership in 1845 in the country store business, and in 1852 Thomas Dickson was able to purchase an interest in the foundry and machine shops which Mr. Benjamin was running in addition to his store. This business is now conducted by J. H. Van Bergen & Co., and Mr. Dickson, when he died, still had a small interest in the firm.

In 1856 Mr. Dickson entered upon his first business enterprise, in which he took the initiative. He went to Scranton, Pa., and with the aid of his experience, acquaintance and capital established the Dickson Manufacturing Company. Associated with him were his father and two brothers, George L.

pany, of Pennsylvania; the Oxford Iron and Nail Company, of New Jersey (in which he was director), and the Grand Tower Mining, Manufacturing and Transportation Company, of Southern Illinois. The latter company was some time ago consolidated with the St. Louis Ore and Steel Company. Among other concerns with which he was connected are the Moosic Powder Company, of Scranton, Pa., and the Lafin & Rand Powder Company, whose mills are near Paterson, N. J., and back of Newburg. Mr. Dickson was for several years a director of the New York Mutual Life Insurance Company, and of the Merchants' and Manufacturers' Insurance Company of Newark, N. J. He was a trustee of Lafayette College, in Easton, Pa., and a member of the St. Andrew's Society. He was one of the original organizers of the First National Bank of Scranton and the Scranton Trust Company and Savings Bank, and was an original stockholder of and furnished the machinery for the Gas and Water Company of that place.

Mr. Dickson was a member of the Presbyterian Church and he made large contributions for religious purposes, and, although no prominent institution is identified with his name, he was a liberal and charitable man. The Lackawanna Hospital and the Home of the Friendless, in Scranton, were large recipients of his bounty. His mode of living was simple, his manners were quiet and he went little into fashionable society. Notwithstanding the scantiness of his school training, he cultivated a literary taste. In 1871 he made a voyage around the world, and subsequently, on several occasions, gave the result of his observations in lectures in Scranton, the proceeds of which were devoted to charitable purposes. Mr. Dickson made his home in Scranton, where he owned a tract of valuable land, containing timber and coal, extending 10 or 12 miles from the Lackawanna River to Dunmore. In 1847 Mr. Dickson married Miss Mary A. Marvin, of Carbondale. His wife survives him. Two of his six children died at an early age. One daughter, Sophia B., was married to Thomas F. Torrey, assistant general Western sales agent of the Delaware and Hudson Canal Company; and another, Elizabeth D., is the wife of H. M. Bois, now the president of the Dickson Manufacturing Company. He leaves also two sons, James P., vice-president of the Dickson Company, and Joseph E., partner in the coal firm of A. S. Swords & Co., of this city.

An Ottawa dispatch says that the Dominion authorities have become convinced that the Welland Canal must be improved so as to give 14 feet of water on the sills as speedily as possible.



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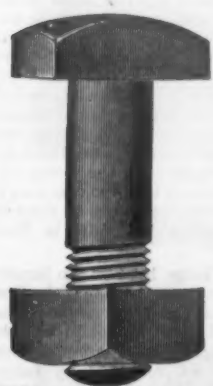
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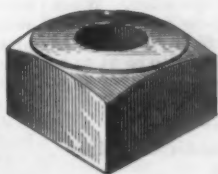
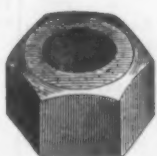


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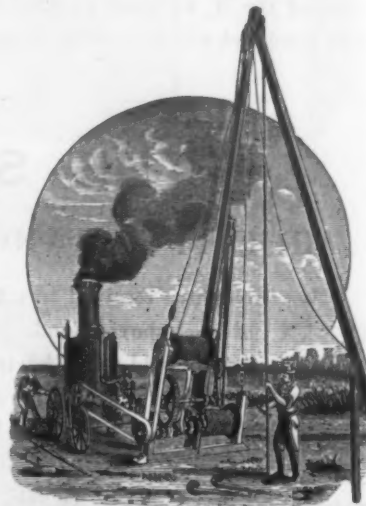
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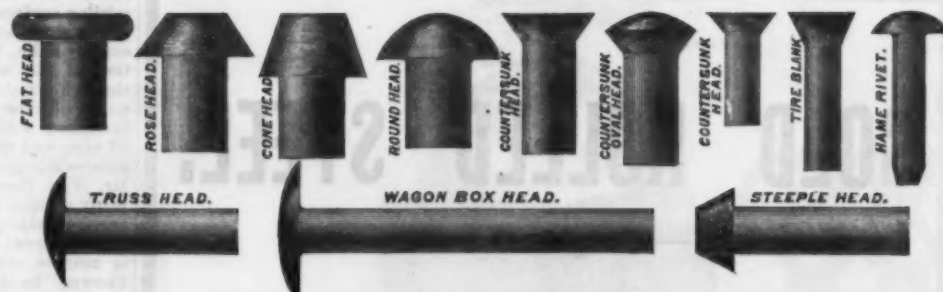
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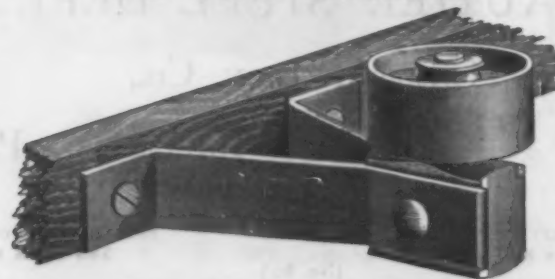
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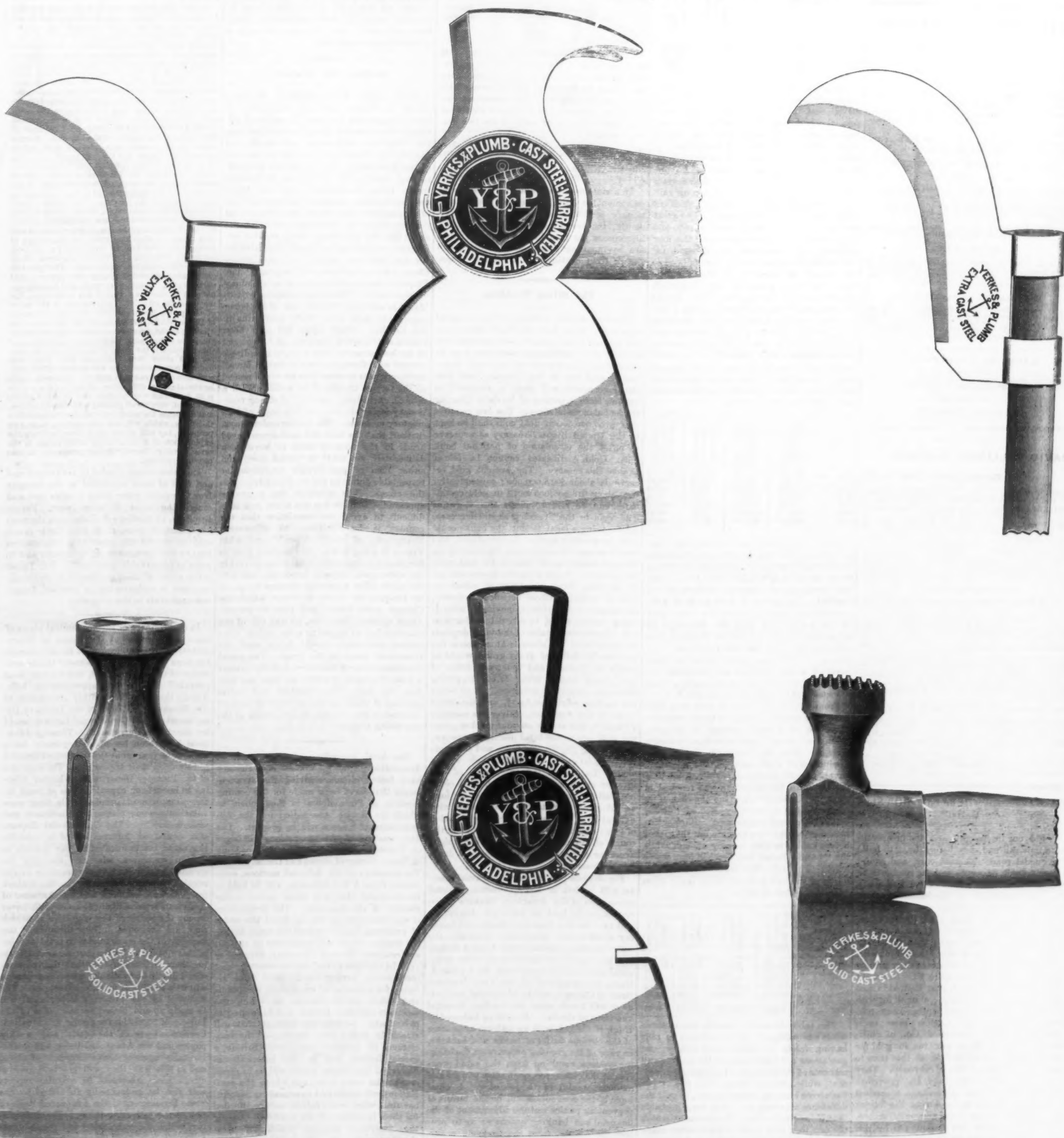
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# The Iron Age

AND

## Metallurgical Review.

New York, Thursday, August 7, 1884.

DAVID WILLIAMS, Publisher and Proprietor.  
JAMES C. BAYLES, Editor.  
JOHN S. KING, Business Manager.

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"And the Road will be Laid with Steel Rails."

"It is our intention," says the prospectus of a new railroad, now before us, "to build a model road. Elegant cars and equipments will be used, and the road will be laid with steel rails." Time was when this announcement of the intention to use steel rails would have been very significant. It is only about 21 years since the first steel rail was laid in the tracks of an American railroad. Steel rails were then in use in Great Britain—to a very limited extent, however—but so enthusiastic in their praises were the railroad managers who had tried them that the Pennsylvania Railroad Company were induced to order a small lot with which to make experiments. They purchased 100 tons of English steel rails, through Philip S. Justice & Co., of Philadelphia, paying \$150 per ton in gold for them, which was equivalent at that time to over \$300 in United States currency. They were made of crucible steel, and proved to contain such a large percentage of carbon that many of them broke during the following winter, which was unusually severe. The company were not discouraged by this unfortunate experience, but gave further orders for 500 and 1000 ton lots, which were presumably made of softer metal. In 1864 Messrs. Justice & Co. sold imported steel rails at \$162.50 per ton gold, or about \$250 per ton currency, but later in the year they were able to supply them at \$135 gold. The Bessemer process of steel production was then in its infancy in Great Britain, and had not been successfully established in this country. On May 24, 1865, the first Bessemer steel rail ever made in the United States was rolled by the North Chicago Rolling Mill Company. In August, 1867, the Cambria Iron Company began to roll Bessemer steel rails in the way of regular business. Other companies soon followed in their wake, and from 1870 the Bessemer steel-rail manufacture assumed in

the United States the position of an established branch of the iron and steel trades. At that time, however, the future of the steel-rail trade was not thoroughly assured, as iron rails could be obtained at very much lower prices than steel rails, and the number of steel-rail mills was very small as compared with the iron-rail mills. The following table will show the relative position of the two branches of the domestic rail trade for the first four years after our Bessemer steel works got fairly into operation, the figures being taken from the reports of the American Iron and Steel Association:

Years.	Iron rails produced, Net tons.	Steel rails produced, Net tons.	Price of iron rails, Current currency.	Price of steel rails, Current currency.
1867.....	459,538	2,550	\$83.12	\$166.00
1868.....	499,489	2,225	78.87	158.50
1869.....	583,936	9,680	77.25	182.35
1870.....	586,000	34,000	72.25	106.75

The prices of rails here given are average prices per gross ton at works. It will be observed that the steel-rail production grew very slowly during this period. The new process presented many difficulties which required the expenditure of much time in experiments. Gradually, however, all obstacles were overcome, workmen became more expert in the discharge of their several duties, steel rails grew in favor among railroad managers, and our works turned out larger quantities of rails yearly. The great extension of our railroad system in 1870 and 1873 assisted the development of the new industry very materially, the demand for steel rails during that period having been so far beyond the capacity of the domestic works that large quantities were imported, 149,786 net tons arriving here from abroad in 1872, and 159,571 tons in 1873. Imports rapidly diminished after the latter year, until in 1876 not a single foreign steel rail came to this country, though a revival of importations took place in 1879, which lasted until the beginning of the present year. The following table shows the relative condition of the two branches of the domestic rail trade from 1871 to 1877:

Year.	Iron rails produced, Net tons.	Steel rails produced, Net tons.	Price of iron rails, Current currency.	Price of steel rails, Current currency.
1871.....	737,483	38,250	\$70.37	\$102.50
1872.....	805,090	94,070	68.22	112.00
1873.....	761,062	199,015	78.67	130.50
1874.....	584,469	144,944	58.75	94.25
1875.....	501,649	290,863	47.75	88.75
1876.....	467,168	412,461	41.25	59.25
1877.....	533,540	482,169	35.25	45.50

In 1877 the production of steel rails overtook that of iron rails, the former having made steady yearly progress, while the latter even more rapidly retrograded from 1872, when the maximum of iron-rail production was reached. The prices of both kinds of rails receded very rapidly toward the latter part of this period. In 1873 the difference in prices was \$43.83 per ton in favor of iron rails, but in 1877 the difference was only \$10.25. In all these years it was no mean boast of a new railroad company that its equipment would be of a good quality, "and the road will be laid with steel rails."

From 1878 to the present time iron rails have been steadily falling in favor, with the exception of a brief interval in 1879-81, when the "boom" gave this dying industry a respite from its inevitable doom. The production of steel rails, on the contrary, advanced with prodigious strides from year to year until the maximum was reached in 1882, since which time the depression in trade that has so seriously affected railroad traffic has caused a falling off. During this period prices fell to a lower point than ever before known in this country, though while the "boom" lasted they touched high-water mark. The following table shows the condition of the two divisions of the trade from 1878 to the close of 1883:

Years.	Iron rails produced, Net tons.	Steel rails produced, Net tons.	Price of iron rails, Current currency.	Price of steel rails, Current currency.
1878.....	322,990	559,795	\$33.75	\$42.25
1879.....	331,160	628,113	41.25	48.25
1880.....	432,782	998,075	49.25	67.50
1881.....	488,581	1,355,519	47.12	61.13
1882.....	527,874	1,460,980	45.50	48.50
1883.....	64,954	1,295,740	quoted.	37.75

This table shows how greatly the iron-rail trade has collapsed, the production in 1883 having fallen to insignificant figures, and quotations not being made in the leading rail markets of the country. It will be observed, that, while steel-rail prices were \$18.25 per ton above iron-rail prices in 1880, in 1882 the difference was only \$3. It is very probable that if we could obtain the prices at which the few iron rails were sold that were made in 1883, they would be found to have been above the steel-rail prices given for that year, as other iron products have not fallen proportionately with steel rails.

We noted in our market report last week that steel rails are now selling at \$28 per ton at Eastern works. It is safe to assume that at the present cost of materials iron rails could not be made at that figure. In any former period of depression they were not made at such a low rate. Iron-rail mills are, therefore, absolutely a thing of the past, except, perhaps, for the manufacture of mine rails. Without taking the fact of the lower wearing qualities of iron-rails into consideration, it does seem very probable indeed that "the road will be laid with steel rails."

### Condition of the Blast Furnaces.

On the opposite page will be found our monthly statement of the condition of the anthracite and bituminous furnaces of the country. From this statement it appears that on August 1 there was a still smaller number of furnaces in blast in the United States than on July 1, the number having been diminished by the blowing out of 16 furnaces since the publication of our last report, of which 10 were bituminous and 6 were anthracite. The following table shows the condition of the anthracite furnaces on the 1st of August, as compared with their condition on the 1st of each of the two previous months:

	Furnaces in blast.	Weekly capacity.	Out of blast.	Weekly capacity.
June 1.....	106	27,972	134	27,805
July 1.....	101	26,949	130	28,765
August 1.....	95	26,144	133	29,525

From this statement it will be seen that the restriction of the production of anthracite pig iron continued in July at almost the same rate as in June. The following table shows the condition of the bituminous furnaces on August 1, as compared with their condition on the 1st of each of the two previous months:

	Furnaces in blast.	Weekly capacity.	Out of blast.	Weekly capacity.
June 1.....	98	45,000	197	42,901
July 1.....	98	47,690	197	44,211
August 1.....	88	48,577	185	49,344

This statement shows a heavy restrictive movement in July, against an almost stationary condition of affairs in June. Evidently, the low prices recently touched for bituminous pig iron in the West and South are having their effect on producers, who shrink from continuing the ruinous competition.

### The Silver Problem.

Treasury officials intimate, through verbal expression, what their published statements had prepared the public to believe—that the issue of gold certificates must ere long be discontinued, on account of the rapid depletion of gold coin in the Treasury, and that the Government will deem it necessary to pay at least a portion of its daily Clearing House balances in silver. The law requires that \$100,000,000 of gold coin shall be kept in the United States Treasury as a reserve to offset the circulation of national bank bills. Gold certificates cannot be issued against this reserve. The present gold reserve is about \$118,000,000; consequently, only about \$18,000,000 more in gold certificates can be issued, unless the store of gold coin in the Treasury should increase. Silver being a legal tender, the banks could raise no question against its acceptance, and would necessarily adjust their business to the changed condition of things in the best manner possible. Aside from the inconvenience of handling large quantities of silver, or even of handling silver certificates merely, the monetary disturbance inevitably attending a change would be seriously embarrassing. The intrinsic value of the dollar depends on the price of bar silver. At 43 pence the legal-tender dollar of 412½ grains would be worth 51.37 cents, and the trade dollar of 420 grains would bring 52.86, supposing both to be in perfect condition. At 50 pence the former would be 54.77, and the latter 56.31, in like condition. Silver has recently advanced, and at the current market price, say 50½ pence, the legal dollar, if unworn, would bring 56½ (86.04 cents), and the trade dollar 57.60 cents, if sold for their weight alone. To compel the acceptance of the inferior metal on a parity with gold could not fail to produce evil effects, so long as Congress permits an interference with natural laws, but bankers are in expectation of large returns of gold from Europe in the course of the next few months, which might avert for a time the consequences of a drain on the Treasury.

For obvious reasons more than usual interest will be felt in the approaching annual convention of the American Bankers' Association, to be held at Saratoga, August 13 and 14. No less than 785 banks and banking institutions, comprising virtually the entire banking capital of the United States, are expected to be represented. The inaugural address of the president, Mr. Lyman J. Gage, vice-president of the First National Bank of Chicago, will be of especial interest, as it will touch upon the leading financial questions of the day. He will be followed by Hugh McCulloch with an address upon some of the obvious duties of banks and bankers, in view of the growing pressure on the banking system, resulting from the rapid progress of the commerce, productive powers and material wealth of the country. A chief topic of the convention will be the means of preventing panics and the adjustment of the financial and banking system so as to protect the country from the frequent occurrence of financial disaster.

If we may be allowed to base an opinion on information sent from London by cable to the daily papers, it seems to us that the proposed American Exhibition in the English metropolis is destined to be a sort of variety show. It is stated that the promoters of the exhibition have issued a pamphlet containing a forecast of the programme, which promises "many novel and unique features." There will be an artisan's hall, in which, in addition to white workmen of many crafts, there will be live Indians, Chinese and negroes playing the vocations to which they are accustomed in America. There will be an exhibition of characteristic American amusements

and sports, including theaters, concerts and balls. American dramatic artists will attend, and there will be displays of American painting, sculpture, drawing and engraving. Many novel phases of American life will be shown by tableaux and interiors. These will include a broker's office in Wall street, a camp fire in Nevada, a San Francisco wine shop, a Florida fruit store, Indian canoe-makers, a receiving and dispatching office for cable dispatches, and reproductions of elevated and electrical railways. Such a varied assortment of attractions ought to please our British cousins if they are at all susceptible to the charms of novelty. We will only add that a "characteristic" American show of this kind would be as great a novelty on this side of the Atlantic as in England, and could doubtless be reproduced here with profit after running through a successful season abroad.

### Eastern War Rumors.

China spurns the conditions of peace offered by France, and the alternative is war. This is the purport of our latest advices. We were indulging in the belief that the would-be belligerents had finally arranged their differences, so that the menace of hostilities might cease to disturb the commercial world—the distractions in Eastern traffic being far-reaching—but our latest mail advices are calculated to dispel all hope of an amicable adjustment. A well-informed correspondent in Shanghai writes to the effect that the late Prince Kung and his colleagues, comprising the Grand Council of the Empire, had been deposed, and that Prince Chun, who is the father of the present boy Emperor, is to be chief adviser in all affairs of importance. The other members are two Manchus and four Chinese, one of the latter among the most reactionary mandarins in the Empire. Prince Chun has long been known as the bitter opponent of foreigners. So far he has never been brought into direct contact with foreign agents at Peking, but all testimony goes to show that he would cancel all the foreign treaties if he could. With a council exclusively made up of strong reactionary materials there is little hope of conciliatory measures. The correspondent says, further, that the best and most experienced heads in the country seem to have been deliberately set aside or passed over, and either men of anti-foreign tendencies or respectable dummies put as chief advisers to the crown. The situation has a graver appearance than it has yet worn, and it is difficult to avoid the conviction that the country is fast drifting to shipwreck. Everything, of course, depends upon what France is going to do. She has now gone so far that it is impossible to let things revert to the status quo. Equally impossible will it be for her to allow a guerilla warfare to go on in Tonquin for years, a course which the Chinese seem determined now to pursue. There appears, therefore, no way out of the situation but an appeal to arms, unless some sudden convulsion should again send the friends of peace to the front. The actual commencement of hostilities is likely to start a train of events of which no man can predict the end. The complete and entire opening of China to the advance of modern civilization may be one of the results of the impending contest.

The local committee of the American Association for the Advancement of Science have issued circulars giving the arrangements that have been made for the coming meeting at Philadelphia in September, at which the British Association for the Advancement of Science will be present. The daily sessions of the associations will begin on Thursday, September 4, at the Academy of Music, corner of Broad and Locust streets. The meetings of the different sections, comprising from A to I inclusive, will be held in Horticultural Hall and other rooms in the vicinity of the Academy. The programme is very complete, giving in detail the order of exercises for the various meetings during the session, which will commence on the 4th and continue through Thursday, September 11. In addition to the regular meetings and conferences, arrangements have been effected for a number of excursions, receptions and other entertainments, in which the members and their friends will be invited to participate. Besides the interest that will attach to such a joint meeting of the associations of America and Great Britain, a special feature will be the International Electrical Exhibition, which will be in progress at the same time, and which the associations will be invited to attend on September 10th, when every facility will be afforded for their inspection of the exhibits. Among the American societies which will meet simultaneously at Philadelphia are the American Institute of Mining Engineers, the American Institute of Electrical Engineers, the Pennsylvania State Agricultural Society, the Agassiz Association and the Association of Collegiate Alumnae. The local committee, as their circulars evidence, have taken great pains to arrange for accommodation for all members and visitors attending the meeting, and for that purpose have secured special rates from the leading hotels; arrangements have also been made with the railroads by which visitors may come from any part of the continent at reduced rates, one of the circulars issued containing particulars concerning these rates, as well as the names and addresses of all the general passenger agents of the several railroads. Informa-

tion concerning the scientific business of the meeting, applications for membership and presentation of papers can be obtained from Mr. F. W. Putnam, permanent secretary, Salem, Mass., up to August 20, after which date his address will be Hotel Lafayette, Philadelphia.

### The Cuban Iron-Ore Enterprise.

Through the courtesy of Juan Tatjer y Riqué, of Santiago de Cuba, we have been favored with an account of the inauguration of the new railroad of the Juragua Iron Company, translated from the account of that event given in the Cuban papers, as follows:

On the 17th of July the railway built by the Juragua Iron Company for the transportation of their iron ore to the bay of Santiago was inaugurated. Invitations had been issued by G. B. Linderman and T. H. Graham, president and director respectively of the company, to about 40 persons, among them the Governor of the Province of Santiago, Luis M. de Pando, and several of the most noted individuals of the city. The press was also well represented. They assembled at 7 a. m. on the dock. At about 7.30 the steamer Mercedes left the pier, arriving at the dock belonging to the company 10 minutes later. There they were received by Mr. Linderman and Mr. King, chief engineer of the company and builder of the railroad. A train made up of several cars adorned with palms received the guests, and the trip began. As soon as it arrived at the splendid iron bridge on the River Aguadores, Mr. Linderman made a speech about naming the bridge Pando's Bridge, on account of the facilities afforded to the company by the Governor of the province. Mr. Pando wished it to be called Linderman's Bridge, after a little speech, but his own name was definitely applied to it. After going over the line, which extends 28 km. (17½ miles), a stop was made at the village of Juraguacito, affording an opportunity to go over the mines, returning afterward to Juragua, where a splendid breakfast was served. The greatest exhilaration prevailed among the persons that partook of it. Toasts were made and heartily applauded by Governor Pando, Mr. Linderman, the mayor of the city, Mr. Aguirrezañal in the name of the press, Mr. Guarnierio, the Superintendent of Public Works, Mr. Schuman, and Mr. Sierre, all alluding to the great event which is bound to develop the riches lying hidden in the mountains of that province in the shape of splendid iron ore, copper and other rich materials. Mr. King was heartily congratulated on the success of the construction of the railway, and the manner in which he obviated the difficulties offered. At 2 o'clock p. m. breakfast was finished, and at 4 the guests separated, very much pleased with their excursion, and admiring the work done by the Juragua Iron Company, which will not only develop their own property, but will at the same time facilitate the exploitation of a good many other mines in the same locality, thereby giving prosperity to that province of Cuba.

The other mines alluded to are located east and west of those controlled by the Juragua Iron Company, some being 6 miles east and others the same distance west. Ferrer Brothers, of Santiago de Cuba, own the most important of them, 18 in all. Their ore is said to possess the same characteristics as that of the Juragua Iron Company, and to exist in remarkable abundance. Mr. Tatjer is the agent of these gentlemen in this country, and is endeavoring to interest American capitalists in the property.

In consequence of the economical views of some of the leaders of the House of Representatives, the publication of sundry reports has been discontinued by some of the departments of the Government, not having been provided for in the appropriation bills. Among these are the monthly statements of the Bureau of Statistics of the Treasury Department and the Commercial Reports issued by the State Department. These publications have been issued so regularly for a number of years that the public had learned to rely upon their appearance. The statistics of the Treasury Department, whether relating to imports or exports, were at least interesting to some people, while they were valuable to some classes of merchants and manufacturers. The Commercial Reports also contained information of a valuable character, communicated by our consuls in foreign countries, who are specially instructed by the State Department to report regularly on the state of trade, the outlook for American products, and the character of American articles likely to meet with favor among the people of the countries in which they are stationed. Notwithstanding the inability of the departments to print the reports referred to for the purpose of distributing them, it is understood that the information will still be available, but its distribution will be a matter of private enterprise. The statistics of the Treasury Department will be made up and placed in the office of the Bureau of Statistics for public examination. Correspondents of the daily and weekly papers and the Associated Press will doubtless take copies or make abstracts of them, and in this way they will get into general circulation. Abstracts of consular reports will also be undoubtedly furnished by the State Department to the Associated Press or newspaper correspondents. The information which the commercial and manufacturing public needs will thus escape suppression, but the fact is not complimentary to this rich and powerful nation, which is so rich that it can afford to squander millions of dollars on river and harbor improvements of doubtful utility, and yet is so economical that it cannot afford a few thousands to continue projects of approved usefulness.

Trade with Korea thus far proves to be a disappointment, so that practically the new treaty has little significance. The wealth of the country appears to have been greatly overestimated, its walls of environment seeming to have assisted the imagination in an exaggeration of the treasures behind them; but its natural resources are doubtless susceptible of development under more



favoring circumstances. A correspondent in Shanghai predicts that there will be but a very insignificant trade for a good many years, the general poverty of the country being such as to make trade on any extensive scale an impossibility. A customs staff of European officers has been organized after the manner of the Chinese customs service, but it is reported that the duties collected are insufficient to pay the salaries. The British Minister to Peking is now in Korea to exchange the ratifications of the treaty made last year, and it was understood that he would endeavor to obtain several important concessions, the benefits of which the United States would, of course, share, on the basis of equality with "the most favored nation."

The Connellsville Coke Producers' Association, which virtually controls the output of coke in the Connellsville region, has lately been running four days in the week, with 75 per cent. of the ovens in operation. They have decided, however, owing to the greater cost of operating in this method, to run the ovens the whole time, making 48-hour coke six days in the week and 72 hour for the Sunday coke, as was formerly the custom, but have concluded to put the fires out in 5 per cent. more of their ovens. So at the present time but about 70 per cent. of the capacity of the ovens belonging to the association is in operation. Coke is now selling at \$1.10, at which price there is little profit, though at some works it barely pays the cost of production and handling, but this is regarded as much more satisfactory than to have the production so far in excess of the demand as to be obliged to sell for 90 cents, which was the price before the association was formed, and which is far below the cost.

It is interesting, in view of the present strike of the bricklayers and laborers in this city for nine hours as a day's labor, that in More's "Utopia," written shortly after the discovery of America, and which pretends to give the laws obtaining in a community that had been discovered on this continent, the hours of labor are given as nine a day. With all deference to the bricklayers, then, it must be understood that Sir Thomas More is the original nine-hour man.

#### The Practical Aspects of Tin-Plate Manufacture.

To the Editor of *The Iron Age*—Sir: I have read with much interest Messrs. Trick & Hutchings' letter appearing in your last issue. They seem to have grown intensely earnest over their subject, as I perceive they challenge and even dare me take up the gauntlet they have thrown down to me. I willingly accept the challenge, and, if you can indulge us that far, will discuss this question of tin-plate manufacture in your columns. I do this not for the purpose of controversy, but because I believe a fair, practical discussion will furnish much interesting data to not only tin-plate consumers, but to the business fraternity in general, and, indeed, the workmen, whom I know to be readers of *The Iron Age*.

I am certainly as anxious as Messrs. Trick & Hutchings can be to see the industry of tin-plate manufacture built up in this country. It is therefore preposterous on their part to assert that I am against America having fair play. I have argued, with perhaps more zeal than they, that we have in this country natural advantages and resources equal, if not superior, to those of any other country for the manufacture of tin plates. Notwithstanding this, the fact remains that no tin plates are manufactured here; and why? Is it because Americans are lacking in enterprise, in ability, in skill or in capital, or is it because capitalists are indifferent to the importance of this industry? Not at all, for, to put it plainly, it is simply because under the existing tariff of 1 cent per pound the business would be unprofitable, the tariff being too low to cover the difference in the rate of wages paid here and those paid abroad. This is where the "rub" comes in, and is the essential point of argument on which Messrs. Trick & Hutchings and I differ.

I shall now briefly review their last letter. That very large part of it having reference to the Hubbard affair, as that concern has turned out to be a fiasco, I pass by without comment. In their criticisms of the few statistics I gave in my former letter, they seem to have entirely misapprehended their nature. I did not attempt to enter into a detailed cost of production. I dealt with the question of wages to labor only. The item "one ton of pig iron" was added to the list for the purpose of covering the difference in wages to labor in each country. I had no intention to presume that a ton of sheet bars could be made out of a ton of pig iron, or that a ton of tin plates could be made out of a ton of sheet bars. I adopted the unit of payment of "one ton" because it suggested itself to my mind as being easily understood and having a tendency to drive away any doubts as to the truth of my deductions. A careful perusal of my letter will disclose the fact that I did not attempt to give the cost of all labor represented in a ton of tin plates, for in the item of "a ton of sheet bars from pig iron" I gave only a part of the labor engaged. Messrs. Trick & Hutchings have seen fit to state that my figures are misconceived, and denounce them as "specious statistics," &c. Very well, I will endeavor to be more minute, and I ask them to be as candid in their presentation of figures as I try to be, or, if they desire to continue as critics only, to state so plainly and allow the discussion to cease.

Regarding the price of pig iron given by me, \$20 per ton in this country, against \$12 per ton in Wales, they claim I am in error. Pig iron, they say, can be bought here at \$16 per ton and in the South at \$12 per ton, or as cheap as it is in Wales. In this case I quoted \$20 per ton as being the price at works; they quote the prices at the fur-

naces. I again quote the average price since the boom for good pig iron, suitable to make good, fibrous iron; they quote the present low, ruinous price of ordinary gray forge pig, of neutral and cold-short grades. To make tin plates of good, reliable quality, a good stock of iron must be used. Good grades of pig iron are seldom sold in this section, not even at this depressed period in the iron business, below \$17.50 per ton. They cannot be, as it can be demonstrated that the cost of production at the present time of good, reliable grades of pig iron is fully up to \$17 per ton. Another point that should be observed is that the price of tin plates has not depreciated within the last two years as much as one-fourth the proportion that pig and bar iron have. We can safely infer from this fact that when pig and bar iron advance in price, tin plates will remain almost absolutely at their present prices, unless, of course, a boom in the iron trade should take place, and English makers could safely advance the price of tin plates. There are many reasons why this is so, but it is not necessary to discuss them here. Still, these facts are significant and of vital importance to Messrs. Trick & Hutchings, for with pig iron advancing in price here, and tin plates being kept almost stationary in price, through the competition of English makers, they would, could they succeed in erecting a tin-plate works, find themselves in a peculiar dilemma. Again, according to well-known laws in business, to build up a trade, good stock must be made, equal, if not superior, to the line of goods, grade for grade, of those already in the market, or they will find no sale. There are several other items of expense that enter into building up a trade in business that require to be carefully considered, and all of which must be kept within the limits of competition, or failure will surely be the result. It is hardly necessary, in a letter of this character, to refer to the excessive competition that has existed among tin-plate makers in England and Wales for many years, which has resulted in low prices, inferior goods and bankruptcy to quite a number. All the weak companies have been annihilated, leaving business at the present in the control of rich, powerful companies. In these premises, it may be interesting to some consumers of tin plates to know that there is much dishonesty practiced in tin-plate manufacture. Sheets (iron) of very poor quality, that would hardly hold to be doubled up loosely without splitting open, become, when tinned, apparently a fair quality of tin plate, and may be doubled up loosely with impunity, without showing much evidence of splitting. This is due to the tin covering, tin being extremely malleable. Once the tin is removed the fraud will be apparent. The amount of tin used in coating is very irregular also. To a box of I C coke, 14 x 20, 112 sheets, weighing 108 pounds, 3½ pounds is considered the average, but I am told that as low as 2½ pounds are sometimes used. The same in charcoal plates; 5 pounds are considered the average for good plates, but it is reported that as low as 3½ pounds are often considered passable. The brands I X and I X X, &c., refer more particularly, as practiced, to heavier sheets of iron, and not that the sheets are coated heavier with tin. This part of our subject will be dealt with more extensively at some future time.

Messrs. Trick & Hutchings seem to have been started almost out of propriety with my statement that in the manufacture of sheet bars from pig iron the cost of labor inside the mill was \$9.65 in this country, as against \$3.89 in Wales. They have corrected what they assume to be an error, by stating that the cost of all labor in this department to a ton of sheet bars in Wales was, according to their last cost account, \$6.80 per ton. They have evidently overlooked the fact that I gave the cost of but a part of that labor. Would they assume that the comparative figures of \$6.80 and \$9.65 would be anything like the truth as to the comparative cost in each country? If not, why did they not also correct \$9.65 as the cost of all labor in this country? But to prevent any further misconceptions or misconstructions I will itemize my statement, hoping they can see clear to itemize theirs. In this statement I simply follow the direct line of manufacture through puddling and bar mill:

United States.	Per ton.	Wales.	Per ton.
Boiling.....	\$5.50	Boiling.....	\$1.70
Muck rolling.....	.45	Muck rolling.....	.20
Catching.....	.17	Catching.....	.10
Dragout and hook.....	.15	Dragout and hook.....	.10
Hammering.....	.75	Hammering.....	.40
Heating piles.....	.75	Heating piles.....	.40
Rolling.....	.50	Rolling.....	.35
Catching.....	.30	Catching.....	.30
Engineer, stockmen, &c.....	1.18	Engineer, stockmen, &c.....	.60
Total.....	\$9.65	Total.....	\$3.89

Rehammering and reheating in this country is twice repeated. Knobbing, smith, brick-laying, common labor, office work, &c., are much higher here than in Wales, which, if added to the above would place the excess in wages paid in this country over \$8 per ton in this department alone. The prices I give for the United States are taken from the Amalgamated Association scale of prices governing mills that manufacture black plates, same process as sheets for tinning. The prices I give for Wales are taken from a number of lists, striking the average, but I believe that wages in Wales are somewhat lower at present than those I quote.

The criticisms of the gentlemen on what they assume I said regarding the discovery of tin deposits in Colorado, and its supposed influence on the price of the manufacture of tin plates in this country, are founded on what I am supposed to have said in an interview with one of our city paper reporters. He misunderstood me and got \$20 in, in place of 20 cents. A slight difference, 'tis true, but sufficient to place great value on Mr. Trick's demonstration. I have in all my letters invariably claimed that it is my belief that the discovery of tin ore in this country, unless it be in very large and rich deposits, will not materially affect the present price of tin. It is now free of duty, the present price is maintained in England in competition with Australian tin, and the price in New York is above that of Liverpool only at about the rate of ocean freightage.

In my former letter I stated that the mills of Leechburgh, Apollo and Demmler had to cease making tin plates for the very same

## Condition of the Anthracite and Bituminous Furnaces of the United States, August 1, 1884.

AUGUST 1.	ANTHRACITE.					BITUMINOUS OR COKE.				
	Total number.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.	Total number.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
DISTRICTS.										
New England.....	1	0	0	1	160					
New York.....	41	15	4,090	26	6,325					
New Jersey.....	18	3	940	15	3,925					
Pennsylvania:										
Lehigh Valley.....	51	24	7,345	27	7,030					
Schuylkill Valley.....	46	18	4,775	28	6,085					
Upper Susquehanna Valley.....	25	12	3,739	13	2,420					
Lower Susquehanna Valley.....	41	22	5,135	19	2,880					
Pittsburgh.....						17	9	7,330	8	6,500
Allegheny Valley.....						4	2	585	2	162
Shenango Valley.....						30	6	3,590	24	7,880
Youghiogheny Valley.....						6	2	730	4	1,166
Junata and Conemaugh Valley.....						26	13	4,494	13	2,845
Maryland.....	5	1	120	4	700	2	0	0	2	230
Virginia.....						14	5	2,151	9	3,220
West Virginia.....						7	0	0	7	2,726
Ohio:										
Mahoning Valley.....						18	5	2,920	13	4,590
Eastern, Central and Northern.....						20	7	2,960	13	5,050
Hocking Valley.....						15	2	242	13	2,360
Hanging Rock.....						15	8	1,550	7	1,085
Kentucky.....						3	2	800	1	400
Tennessee.....						8	6	2,620	2	980
Georgia.....						1	1	600	0	0
Alabama.....						9	6	3,280	3	1,220
Indiana.....						2	1	200	1	200
Illinois.....						16	10	8,275	6	3,700
Michigan.....						2	0	0	2	580
Wisconsin.....						3	2	1,000	1	540
Missouri.....						8	1	550	7	3,810
Total.....	228	95	26,144	133	29,525	226	88	43,877	138	49,244

reason as will prevent these men from commencing to make them. They seem to dispute this, and point to the evidence of Mr. Rogers, who was at one time connected with the Leechburgh Works, as proof of my mistake. They point to the fact that Mr. Rogers did make tin plates successfully, and was able to sell them in competition with English makers. I admit this to be true, and to Mr. Rogers we may also add the Demmler and Apollo works. I have been referring to these works as instances that tin plates could be made here, and that successfully, because quite a number of our business people are under the impression that tin plates cannot be successfully made in this country. But, I may be asked, why is it that tin plates could be made from 1873 to 1877—the period in which tin plates were manufactured here? The answer is brief: Because the price of tin plates was so high as to allow American makers a margin for profits, paying high wages. It is somewhat strange that these gentlemen have overlooked this thought. Tin plates in 1873 sold as high as \$12 per box in this country; in 1875, good quality coke plates sold at \$8.50 per box, and in 1878 they were down to \$5.25 per box. The American works had ceased before tin plates reached this lower price, and have never since been able to resume. The companies owning these works were completely broken up, and I believe that the company Mr. Rogers was connected with became insolvent, with liabilities something like \$200,000 in excess of assets. I will hardly dispute the point raised, "that much astonishment is expressed by Mr. Rogers that the manufacturers in this country have not entered into the manufacture of tin plates, when they can secure the cheapest and best fuel (natural gas) in the world for its manufacture." I will only add that we have the best-paid labor in the world to provide for, and our astonishment is that Congress has not as yet seen clear to put sufficient tariff on tin plates as to enable our manufacturers to go into the business.

In answer to the question, "And has he (myself) quite forgotten his conversation with Mr. Hutchings?" In answer: No, indeed. I remember it all, and have not changed one iota in my opinions as then expressed. Messrs. Trick & Hutchings claim to have figures of costs compiled in the production of tin plates, but which they say would be prejudicial to their personal and private interests to publish. Have they any objections to publish the list of wages they intend paying? This is really the pith of the argument. I am prepared to show in detail that a ton of pig iron in this country at \$20 per ton represents \$7 more wages paid than a ton of pig iron in Wales at \$12 per ton. In a former part of this letter I have shown that the wages paid to make a ton of sheet bars in this country is over \$8 in excess of that paid in Wales. In my former letter I stated that the labor to produce a box of tin plates from bars in Wales amounted to 87 cents. In this country the same labor would amount to \$2.26 per box. I am prepared to give an itemized statement at any time. The labor expended and wages paid in this country on 20 boxes in excess of that paid in Wales may be summarized thus:

Excess in wages on 13-10 tons of pig iron at \$7.....	\$9.10
Excess in wages on 13-10 tons of bars at \$8.....	9.60
Excess of wages on 20 boxes of tin plates at \$1.39.....	27.80
Total excess in wages.....	\$46.50

I have no doubt but that these figures will be ridiculed, and attempts may be made to make it appear, as we see it hinted in their last letter, that we have cheap fuel, &c. It may be argued again that the price of pig iron is much lower than I put it, and other excuses may be advanced, but I wish them to come out square on this question of wages. Whatever natural advantages we possess will eventually be reaped by the consumer as the result of home consumption. The tariff is primarily to protect labor. Let us have no circumlocution, no verbosity, but a clean cut argument on the wages part of the question from this on. I shall, however, have no

objections to enter into general costs if necessary, and, believing it will be of general interest, I have inserted a cost sheet of tin-plate production in Wales, which, while rough, is near enough for all practical purposes:

ROUGH COST SHEET TIN PLATES.	
Coke.	
Iron, 1 cwt. 1 qr. to 1 box, at 6/ per cwt., bar.7	s. d.
Less scrap at 3/6, 28 lb.....	10
Net cost of bar.....	6 8
Tin, 3½ lb to 1 box, at 10d, of 14 x 20—112 sheets.....	2 11
Labor, bar to finish.....	3 6
Coal.....	6
Vitriol, black and white pickling.....	6
Pain oil.....	1
Brass.....	1
Boxes.....	3
Annual pots.....	14 6
Rents and taxes.....	14 6
Management, &c.....	3
Machinery, wear and tear, &c.....	2
Carriage, &c.....	2
Discount, 4%.....	8
Net 1 box I C, 108 lb.....	16 4
Charcoal.	
Iron, 1 cwt. 1 qr. to 1 box at 8/.....	10 00
Less scrap.....	1 00
Net cost of bar.....	9 00
Tin, 3½ lb to 1 box.....	2 11
Labor, bar to finish.....	3 6
Coal.....	6
Vitriol, black and white pickling.....	6
Pain oil.....	1
Brass.....	1
Boxes.....	3
Annual pots.....	14 6
Rents and taxes.....	14 6
Management, &c.....	3
Machinery, wear and tear, &c.....	2
Carriage, &c.....	2
Discount, 4%.....	8
Net 1 box I C, 108 lb.....	19 11

Many useful inferences may be drawn from this cost sheet, but I shall allow the reader to work out his own.

In conclusion, I would wish to impress Messrs. Trick & Hutchings that I have no desire to put anything in their way to success. We are using all honorable means to awaken a proper interest in the minds of tin-plate consumers and the public generally in the importance of this great industry. To build up this industry we require equitable protection against the monopolistic power of the English manufacturers. We believe that they cannot possibly succeed in their present efforts, in which they have already had two years' experience. And as they have declared their intentions of becoming American citizens, we invite them, as practical tin-plate manufacturers, to utilize their arguments in favor of a protective tariff, so that we can not only build up the industry of tin plates, but assure to tin-plate consumers good material and give good value for their money, and living wages to a host of workmen. Truly yours,

JOHN JARRETT.

PITTSBURGH, Aug. 2, 1884.

#### The Manufacture of Steel Nails.

To the Editor of *The Iron Age*: On the 11th day of May last the first blow was made at the Riverside Iron Company's Bessemer-steel plant, a general plan and description of which appeared in *The Iron Age* of April 3, 1884, so I shall not enter into the details. Suffice it to say that it was designed by and constructed under the direction of Mr. Charles Amsler, its present superintendent, and is well adapted to turning out the kind and quantity of steel for which it was intended. It is scarcely necessary for me to state that this mill was erected expressly for the production of soft steel to take the place of iron in the manufacture of nails. It was predicted by many that the new venture would result in a disastrous failure, the reason being that it would be impossible to produce a steel sufficiently soft and uniform in quality to give satisfactory results in cutting. These predictions were not only indulged in by those not familiar with the Bessemer process of making steel, but were made by many who were supposed to be familiar with that and

other processes. Notwithstanding these adverse predictions, the Riverside Company began and rapidly pushed forward the work of erecting their new plant until the time above stated, since which time they have been producing steel that has been and is giving entire satisfaction. It has not only been clearly and forcibly demonstrated that it is possible to produce Bessemer steel nails that are as good and reliable as iron, but it has been demonstrated beyond a doubt that they are a much finer and better nail in every respect than those made from puddled iron, being smoother and of closer grain, and presenting a much finer appearance.

One of the great objections to iron nails is their brittleness. For instance, take an iron nail, strike it on one side with a hammer, and before it has been bent to angle of 20° it will have broken. On the other hand, take a steel nail such as is being manufactured by the Riverside Company, and it can be bent double without showing any sign of fracture whatever; or, in fact, you may subject it to the severest tests possible, and in every one it will stand a much better test than the iron nail. It was thought by many that steel to be soft enough to cut easily would be too soft for nails, but this is not the case, for I have seen these nails frequently driven into the hardest oak and locust without showing any sign of bending whatever. I have not only seen them driven point first, but I have also seen them driven head first, into a hard-oak plank, which I consider a very severe test.

In regard to the uniformity of the steel produced by this process for nails and other purposes, I believe we have demonstrated beyond a doubt that it is by far the better one, where uniformity and reliability are desired. We have been blowing since the 11th day of May, making in all 500 blows with a variation in carbon of 1/100 per cent. In fact, we usually run our carbons at 1/100 per cent., seldom, if ever, going above or below this point. Our manganese runs with the same uniformity, being very low—in fact, lower than usually found in Bessemer steel. We have also succeeded in reducing the silicon to such a low degree as to permit the steel to be welded as easily as puddled iron. In fact, the so-called steel we are producing is nothing other than ingot or homogeneous iron. The advantage attained by reducing the silicon, and thereby producing a welded steel, is that, if there be a flaw or crack in the slab or bloom, it will be welded in the process of rolling, providing the bloom be heated to a welding temperature, as it should be when rolling steel of this kind. By being able to reduce carbon manganese and silicon to such a low degree, we can with safety work irons quite high in other impurities, such as phosphorus, sulphur, copper, &c. Of course, if the product was intended for purposes other than nails, it would not be desirable to use irons high in these impurities.

The superiority of this material over iron produced by the puddling process cannot reasonably be disputed. Its superiority consists in its being more solid and uniform throughout the ingot, thereby producing a much solidier bloom. This is brought about by its being cast when in a state of high fluidity, which necessarily gives a more compact and solid, as well as more uniform, ingot than can be produced by any system of piling. In regard to the rolling and cutting quality of this material I do not see how it could be better, it being much better than that of iron. At least this is the testimony of quite a number of nailers who have been cutting this material since its introduction. One prominent and noticeable feature in rolling this steel is the absence of ragged edges and ends, and the smoothness and cleanness of the plates when finished. Notwithstanding the success that has attended the Riverside Company in their new venture, it has been reported that quite a number of inferior steel nails have been put on the market. I do not know whether this be true or not; but, if true, one thing I do know—that they were not manufactured by the Riverside Iron Company, Wheeling, W. Va.

S. McDONALD.

BIRWOOD, July 31, 1884.



# THE TWO-WHEELED CASTER CONTROVERSY.

To the Trade and all others whom it may concern:

The Yale Caster Company, of New Haven, Conn., have been infringing upon our rights under A. C. Martin's patent, dated May 1, 1877, for several years past. As soon as they began to put their goods upon the market, we notified their agents and the Trade of the fact of such infringement, and that we should hold all infringers liable in damages. This notice was unheeded, and we were preparing to bring suit in the New York Circuit Court against M. B. Schenck, who claimed to be the patentee of the caster made by the Yale Company, when we discovered that the Schenck Casters were on sale in this city by Mr. Nelson Kingman, and we immediately brought suit in the United States Circuit Court for this District for an injunction and accounting. We did not care to subject Mr. Kingman to expense, as he professed to have purchased the stove trucks to which the casters were affixed from Schenck's agents innocently. We expected, and he expected, that Schenck or the Yale Caster Company, or both of them, would defend him. But they failed and neglected to do so, and left their customer to get out of the scrape the best way he could.

Our attorney then, at our request, after waiting beyond the usual rule day, wrote to M. B. Schenck, at Fulton, N. Y., offering to waive the default we were entitled to, and extend the time for filing an answer, if he would appear and defend his customer. No answer was received, and a default was finally taken and set down for hearing before Judge Drummond. On that hearing we made full proofs, introducing in evidence the Schenck Patent, the Schenck Caster, the Martin Patent and the Martin Caster, and proved also that notice had been sent to Schenck; and on the 4th day of May, 1883, Judge Drummond made a finding of all the above facts, holding that the Schenck Caster, as shown in his Letters Patent No. 250,290, dated November 29, 1881, was an infringement of the Martin Patent, and rendered a decree of perpetual injunction in our favor, and a judgment for all costs.

The Yale Caster Company and Schenck, after the rendition of this decree, published an article in *The Iron Age*, denouncing it as a sham case, a straw decree, and then undertook to dodge its effect by claiming that they were making casters not under the Schenck Patent, but under another patent dated October 9, 1877. To this blast we replied through *The Iron Age* that but two patents were issued for casters on October 9, 1877, and neither of these were for double-wheeled casters, but for casters having one ball in a socket and the other a single floor wheel. The Yale Caster Company then, under date of May 19, 1883, wrote us a boastful and abusive letter, strangely concluding it by inviting us to offer them terms of compromise, which we declined to do.

We then notified general agents at Chicago, Messrs. Munger, not to handle any casters infringing Martin's Patent, and sent them a printed copy of the decree in the Kingman case.

Here the matter rested until early in this year, 1884, we discovered that Messrs. Spiegel, Thoms & Co., of this city, furniture manufacturers, were using the Yale Caster upon their goods, and on inquiry found that they

had bought them of John Duer & Co., of Baltimore, Md., who are the agents of the Yale Caster Company. We immediately brought suit against them in our United States Circuit Court for an injunction and accounting. At the proper time an answer was filed for the defendants, and we have just concluded the taking of our testimony in chief, and among other things we proved by competent experts:

1st. That the caster now sold to the Trade by the Yale Caster Company is an infringement of Martin's Letters Patent.

2d. That before Martin's Patent no caster had ever been known or made having two floor wheels, which was adapted to oscillate in a vertical plane and revolve in a horizontal plane.

3d. That the attorney appearing for the defendants, Spiegel, Thoms & Co., was not known to or employed by them, but by M. B. Schenck, acting for himself and the Yale Caster Company.

And thereupon we further put in evidence models of the Yale Casters, the Schenck Patent, the Yale Company's circular and their polite (if) letter to us before mentioned, and we further proved that the date of the patent stamped on their casters, "Patented October 9, 1877," was deceptive, and that no double-wheeled caster was patented on that date by anybody.

We cordially invite the Yale Caster Company and M. B. Schenck to prove the truth of what they set up for the defendants in their answer, that the Kingman suit was a "sham suit" or a "straw decree," or entered by collusion with anybody. They know such statement is false, and dare not try to prove it.

And now to the Trade we say once more we are in bitter earnest, and will prosecute every concern that handles these infringing goods. We are in this fight, and shall stay till the end. Our trade has been damaged, our rights violated, and the firms who have been so eager to try cheaper goods will find them to cost more in the end.

And this circular is intended to be a warning to every dealer that we shall hold him responsible as an infringer if he deals in these infringing casters. We have, by many years' labor and at great expense, built up a lucrative and honorable trade in our casters, and we are not going to stand by and see our good ship either plundered or scuttled by pirates. On the contrary, we shall use every weapon known to the law and legitimate warfare in defense of "our rights, our fortunes and our sacred honor."

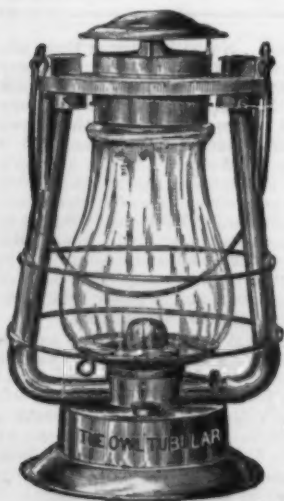
For the Phoenix Caster Company,

INDIANAPOLIS, Ind., July 10, 1884.

WM. H. TUCKER, President.

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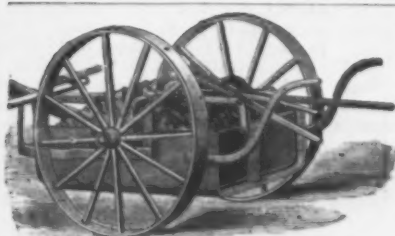
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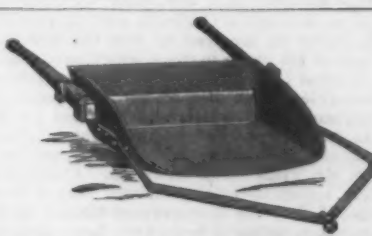
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We are prepared to receive **PIG IRON**, **BLOCKS**, **INGOTS**, **MUCK-BAR**, **RAIL** and **SHEET IRON**, Car Wheels, Rails, **LUMBER**, **ONE**, &c., also every kind of merchandise, on storage. Warrants will be issued on all stock received, made transferable by indorsement and deliverable to the holder on demand. These warrants will furnish a convenient medium of transfer and delivery, and serve as collateral to parties wishing advances on their stock. We shall be glad to furnish full particulars as to the manner of transacting business, and invite correspondence or personal interview.

W. R. DRAKE, Sec.  
Room 35, Merchants' National Bank Building.



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### Special Notices.

NEW AND SECOND-HAND  
**MACHINERY.**

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- 1 Bull Lathe, 50 in. swing, 6½ ft. bet. centers, sd-hand.
- 1 48-in. Boring Lathe, 6 ft. bed, 20 ft. bet. centers, sd-h.
- 1 24 in. Boring Lathe, 8 ft. bed. sd-hand.
- 1 Engine Lathe, 74 in. sw., 16 ft. bet. centers, sd-h
- 1 Engine Lathe, 30 in. swing, 18 ft. bed. sd-hand.
- 1 Engine Lathe, 30 in. swing, 12 ft. bed. sd-hand.
- 1 Engine Lathe, 30 in. swing, 18 ft. b-d. sd-hand.
- 1 Engine Lathe, 30 in. swing, 25 ft. bed.
- 1 Engine Lathe, 30 in. swing, 18 ft. bed.
- 1 Engine Lathe, 30 in. swing, 8 ft. bed. New.
- 1 Engine Lathe, 30 in. swing, 12 ft. bed. New.
- 1 Engine Lathe, 20 in. swing, 9 ft. bed. sd-hand.

1	Engine Lathe,	20 in. swing,	8 ft. bed.	New.
1	Engine Lathe,	20 in. swing,	8 ft. bed.	ad hand.
1	Engine Lathe,	19 in. swing,	10 ft. bed.	New.
1	Engine Lathe,	19 in. swing,	7 ft. bed.	New.
1	Engine Lathe,	18 in. swing,	10½ ft. bed.	ad-hd.
1	Engine Lathe,	18 in. swing,	8 ft. bed.	ad hand.
1	Engine Lathe,	17 in. swing,	7 ft. bed.	New.

1 Engine Lathe, 15 in. swing, 5 ft. bed. New.  
 1 Engine Lathe, 23 in. swing, 4 ft. bed. New.  
 2 Engine Lathe, 23 in. swing, 4 ft. bed. New.  
 1 Plain Lathe, bek-grd., 14 in. x 5½ ft. bed. ad-hd.  
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 1 Hand Lathe, 10½ in. swing, 3½ ft. bed. ad-hd.  
 1 Hand Lathe, 10 in. swing, 4¼ ft. bed. ad-hd.  
 1 Hand Lathe, 10 in. swing, 4½ ft. bed. ad-hd.  
 1 Hand Lathe, 10 in. swing, 3½ ft. bed. ad-hd.  
 1 Foot-Power Hand Lathe, 8½ in. swing, 3 ft. bed.  
 1 Oval Turning Lathe ad-hd.  
 1 Iron Planer to plane 34 in. x 36 in. x 9 ft. ad-hd.  
 1 Planer to plane 32 x 32 x 4 ft. ad-hd.  
 1 Iron Planer to plane 24 in. x 24 in. x 5 ft. New.  
 1 Iron Planer to plane 24 in. x 24 in. x 5 ft. New.  
 1 Iron Planer to plane 24 in. x 24 in. x 4½ ft. ad-hd.  
 1 Iron Planer to plane 20 in. x 20 in. x 5 ft. New.  
 1 Iron Planer to plane 20 in. x 20 in. x 4 ft. New.  
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 1 20 in. Upright Drill. B. G. New.  
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 19 in. Upright Drill, Lever Feed. ad-hd.  
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 4 Four Spindle Gang Drill Press. P. & W. ad-hd.  
 4 Four Spindle Gang Drill Press. Very light. ad-hd.

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 1 Heavy Duty Milling Machine with Arm. New.  
 1 Back-Geared Power Miller, with Arm. New.  
 1 Column Miller, with Fr. Centers. ad-hand.  
 1 Hand Miller. New design.  
 1 Hand Miller and Screw Design. ad-hand.  
 1 Large Cutter, 24 in. diam. x 8 in. face  
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 1 Gear Cutter. Cuts 26 in. diameter. New.  
 1 16-inch Slotter to center of 54 in. ad-hand.  
 1 Square Cutter, 12 in. diam. for Grasswood. New.  
 1 64 in. Centering Machine. New.

3 in. Cutting-Off Machine. New.  
 4½ in. Cutting-Off Machine. New.  
 Horizontal Nut Tapper for 3-10 holes. New.  
 Bolt Cutter, 1½ in. and under ad-hand.  
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 Twist Drill Grinder. New.

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Power Punching Press. ad-hand.  
No. 18 Adjustable Inclined Power Press. New.  
No. 19 Adjustable Inclined Power Press. New.  
No. 20

No. 2. Adjustable Inclined Power Press. New.  
Power Presses. 2d hand.  
Heavy Bench Screw Press, 1 in. screw. 2d-hd.  
Screw Press, with Table. 2d-hand.  
No. 1 Screw Press on Legs. New.  
Large Foot Press. 2d hand.  
Small Foot Presses. New.

Root-Power Punching Press,  $\frac{1}{2}$  in. x  $\frac{1}{4}$  in. New  
13-in. Drop Press, 2d-hand.  
9-in. Drop Press, 7 ft. guides. 2d-hand.  
7 in. Drop Press, 5 $\frac{1}{2}$  ft. guides. New.  
Hand Lever Punch to punch  $\frac{1}{4}$ -16 to  $\frac{1}{8}$ -16 iron.  
Heavy Alligator Shear, 17 in. Jaws, 2d-hand  
Heavy Alligator Shear, 7 in. Jaws. 2d-hand.

Power Slitting or Circular Shears. New.  
 G-rated Power Slitting Machine. No 6 Iron. New.  
 Circular Shear for No. 12 Iron. 2d hand.  
 Squaring Shears for Power. New.  
 22-in. Squaring Shear for light sheet iron. New  
 Squaring Shear, with open throat, for power.  
 Pair 20 tk Power Bending Rolls. 4d hand.

Pair 6 ft. Bending Rolls, for hand power.  
Double End Power Bending Machine, sd-hand.  
Geared Bar Iron Cutters for 1 in. iron, sd-hand.  
48 in. Paterson Forge, complete, sd-hand.  
Grindstones and Frames, New.  
Large Lot Chisels and Hangers, sd-hand.  
Lot Lathes, Chucks, different sizes, New.

200-Lb. Case Checks, different sizes. New.  
 Scroll Saw, complete. New.  
 22-in. Rotary Bed Surfacing Machine. New.  
 Saw Bench. 2d-hand.  
 Gauge Lathe. Turns 46 inches long. New.  
 No. 6 Cameron Steam Pump. 2d-hand.

**J. M. BADGER.**  
9 DEY STREET, New York City.

**For Sale.**  
A full line of Hardware, Stoves, Iron and Tin-  
ware, centrally located in the largest and best  
manufacturing city in Northern Indiana. Well

Established, with an excellent trade. Stock clean;  
 all invoice about \$10,000. Address  
 "X. Y. Z. & Co.,"  
 Office of *The Iron Age*, 36 Clark St., Chicago, Ill.

**Wanted.**  
By a married man with a large acquaintance in the trade of Minnesota, Dakota, Montana, and part of Wisconsin, also Province of Manitoba, a position to represent Manufacturers of hardware either on commission or salary, with

Address, "M," Lock Box 57, Alexandria, Minn.  
Satisfactory reference if desired.

**Hardware Price Books.**  
A Revised and Improved Edition of my Pocket  
Price Book is now in the hands of the printers.

**Wanted—Superintendent.**

good, reliable man, acquainted with Light and Iron Work, capable of managing about hands to best advantage.

ce of *The Iron Age*, 83 Reade Street, New York, giving references, what experience and salary expected.

\_\_\_\_\_

WANTED—A situation as Traveling Salesman by a young man of twenty-five, with eight years' experience in the Hardware business, both upon the road and in the store. Has a sixty-day trip in Western Minnesota and Eastern and North Dakota, on the

**WANTED**—A steady situation by a practical Machinist—has experience of Machine Shop. Call on Northern Pacific and St. Paul, Minneapolis. Manit. ba roads. Good reasons given if require; wishing to change houses. Will take new territory, if required. Can give first-class reference. Address "L," Lock Box No. 514, Fargo, Dakota.

Graduate of the College of Engineering, Cornell University, Ithaca, N. Y.  
 Engineer: 25 years' experience in building and erecting  
 Engines; also good experience in Blast Furnace  
 Rolling Mill. References not required.  
 Address: "PRACTICAL MACHINIST,"  
 Office of The Iron Age, 53 Roade St., New York.

to 14 in. Engines, 2 Portable Engines, Worm  
st, 2 Baker Rotary Wood Planers.  
A. G. BROOKS,  
261 N. 3d St., Philadelphia.

1



Billiton at 50 guilders. At these figures there are more buyers, but holders ask 1 guilder advance. October delivery of Billiton is held at 50.75. Amsterdam is quiet, Billiton spot, 50 guilders bid; October wanted at 50.25 @ 50.50; Banca, nominally 52.50.—Koch & Vlierboom.



# Trade Report.

## Philadelphia.

Office of The Iron Age, 220 South Fourth St.,  
Philadelphia, August 5, 1884.

**Pig Iron.**—The demand has been very languid since date of our last report, and, while prices are not quotably lower, there is no doubt of the fact that the market shows less firmness than it did a few weeks ago. Some people were of opinion that prices could not go lower, for the reason that many were barely clearing cost, while others were losing money on every ton of iron sold. Prices are lower, notwithstanding all theories to the contrary, and they look like going still lower yet before there is any general reaction. The law of supply and demand cannot be ignored, so that under present conditions there is no great risk in predicting further weakening in prices before there is an improvement. The supply is not excessive by any means, but sellers cannot hold their trade unless by making concessions, which in a short time amount to a practical reduction all around. This, unfortunately, is the position to-day, and, in fact, there has been no single instance within the past six months when a seller would venture to ask for better terms than was accepted in the transaction immediately preceding. This, of course, is a very one-sided business, but it will continue so long as there are more sellers than buyers. The chances are, therefore, that the market will continue weak until there is such a demand for the products of Pig Iron as will force consumers into the market. The theory that low prices creates a demand does not accord with facts. Low prices may and do curtail the supply, and in that way they prepare the way for an improving market. The iron trade is passing through an experience of this kind; prices have been dropping, and the supply gradually decreasing until at last there is little doubt that the decline has very nearly run its course. While there is nothing in the present condition of the iron trade to warrant predictions of immediate improvement, it is probable on general principles that the abundant crops, the return of specie from Europe and a satisfactory termination of the elections will lead to an increasing demand, and ultimately to better prices. Meanwhile, business is slow and prices easy, if not lower. No. 1 Foundry is generally quoted at about \$20, Philadelphia, for good brands, but sales are in small lots; otherwise, shading to the extent of from 25¢ to 50¢ per ton is expected, and from that to \$1 per ton on large lots. No. 2 Foundry is very dull, and nominally quoted at from \$18.50 to \$19. Mill Irons, under sharp competition for business, are a shade easier, with sales of good brands at prices ranging from \$17 to \$17.50, although \$18 is the nominal quotation. Sellers are anxious for business, and to good buyers are disposed to yield something in price, providing good-sized orders can be had. Buyers are very cautious, however, and while a few thousand ton orders have been secured, the rule is to buy only for immediate requirements.

**Foreign Iron.**—There is no demand for large lots of anything. Special brands of Bessemer are being taken in lots of 200 to 300 tons each, but there is no demand from the large consumers. Spiegel is nominal at \$28 asked for 20¢; \$23.50 for 10¢ to 12¢, and \$77 for 80¢ Ferro-manganese, with sales of the last named in 100-ton lots.

**Blooms.**—There is no change to notice either in price or demand, which is very languid. Asking prices are about as follows: Charcoal Blooms at \$53 @ \$55; Run-out Anthracite, \$43 @ \$45; Scrap Blooms, \$40 @ \$42; Northern Ore Blooms, \$38 @ \$40.

**Muck Bars.**—The demand is very light and only small lots are taken, prices varying from \$29.50 to \$30, according to quality and location of mill.

**Bar Iron.**—Business has been very light during the week, and not quite up to what was expected. There is considerable inquiry at times, but no large lots are called for, so that the mills are running close on their orders and depending largely upon what may come in from day to day. Prices are unchanged, with 1.85¢ at 1.9¢ for the range for Best Refined Bars and 1.7¢ @ 1.8¢ for Common and Medium grades.

**Plate and Tank Iron.**—The demand is less active than it has been for several weeks past, although the mills are comfortably supplied with orders for the present. It was hoped that the recent active demand for Plates would be followed by a corresponding improvement in other departments, but this has not been realized. On the contrary, things seem like settling down into the old rut, although the reaction may be only temporary. In the meantime prices are a trifle easier, with the asking rates as follows: Plate Iron, 2.1¢; Tank, 2.15¢; Shell, 2.75¢; Flange, 3.75¢; Fire-Box, 4.25¢.

**Structural Iron.**—There has been no business out of the usual routine demand for small lots, so that the position, as compared with last week, shows no change. Manufacturers are fairly well supplied with orders, although there is not the activity which was generally expected. There is more business in sight, however, so that there is no reason for expecting any material falling off in consumption, although there is some anxiety

to secure business. Competition keeps the market in a feverish condition, and, while prices are nominally unchanged, there is considerable shading done on large orders. The nominal rates are as follows: Angles, 2.1¢ @ 2.2¢; Bridge Plates, 2.25¢; T's, 2.75¢; Beams and Channels, 3.5¢, less the usual discount on large orders.

**Sheet Iron.**—There is no change worth reporting. The demand is fair and the season's business up to an average. Prices show no improvement, and for small lots may be quoted as follows:

Best Refined, Nos. 26, 27 and 28..... 4¢  
Best Refined, Nos. 18 to 25..... 3½¢  
Common, ½¢ less than the above.  
Best Bloom Sheets, Nos. 30 to 35..... 6½¢  
Best Bloom Sheets, Nos. 22 to 25..... 6¢  
Best Bloom Sheets, Nos. 18 to 21..... 5½¢  
Common Red Plates, 9-16 to 16..... 3½¢  
Blue Annealed..... 2½¢  
Best Bloom, Galvanized, discount..... 50¢  
Second quality, discount..... 25¢  
Common, discount..... 25¢

**Wrought-Iron Pipe.**—This branch of trade continues dull, although more sales are reported, principally in small lots. Under a light demand prices rule weak, though nominally unchanged. Discounts as follows: Butt-Welded Black Pipe, 30¢; Butt-Welded Galvanized, 20¢; Lap-Welded Black, 50¢; Galvanized, 35¢; Boiler Tubes, 47½¢.

**Steel Rails.**—There is nothing of interest to report in this market. Small lots are called for somewhat frequently, but the aggregate amount is not important. Prices are nominally from \$29 to \$30 at mill, but good-sized orders can be placed on better terms. Sales have been made at \$28, if not less, but without making a firm offer it is almost impossible to say what price would be accepted. The outlook is not specially encouraging, although it seems very improbable that these figures will continue for any length of time, as some mills shut down when prices were \$2 or \$3 per ton higher.

**Crop Ends.**—There is more inquiry, with sales of 1000 tons "Barrow" at a figure equal to \$21, ex-ship, Philadelphia.

**Old Rails.**—Sales to the extent of about 6000 tons have been made during the week. Five thousand tons were taken in lots at an average price of \$18, in store, Philadelphia, and a 600-ton lot of Bull Heads at prices not named. Small lots of T's are held at from \$18.50 to \$19, with stocks in better shape than they have been for some time past, although buyers are by no means anxious. Prices are steadier, however, and with limited supplies holders are firm at the rates named.

**Scrap Iron.**—There is more doing and prices are steadier, with sales of Choice No. 1 at \$20.50 @ \$21; Machinery Scrap, \$14.50 @ \$15; Wrought Turnings, \$14.50 @ \$15, and Cast Turnings at \$9.50 @ \$10; Steel Scrap sold at \$20.50 for 200 tons, and Fish Plates at \$24 for a similar quantity.

**Nails.**—The demand continues fair for the season; prices, however, are weak and irregular. We quote large lots \$2.25 @ \$2.30; small lots, \$2.40, although there are rumors of considerably lower figures being made in some cases.

It will be of interest to furnace managers to know that for the first time specially prepared low-phosphorus roasted Ore, by the Taylor-Langdon process, is now offered for sale. Until now all such stock has been consumed by the companies producing it. (See announcement by J. Wesley Pullman on page 40.)

## Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue,  
Pittsburgh, Pa., August 5, 1884.

There has been no material change in the general iron situation since our last report; there has certainly been no improvement, and while in some respects the outlook is favorable, in others it is not. Production both of the raw material and the products is light, as both furnace and mill men are averse to "piling up" any more than they can possibly help, and jobbers and consumers as well have been carrying very light stocks of finished for more than a year past. The crops are good throughout the country; farmers and country merchants are generally in good condition, and the indications are that there will be an improved demand for all kinds of manufactured goods within the next few weeks, although it is not likely that there will be any marked activity. The railroads generally report business as being dull and considerably short of what it was a year ago, and this has had a good deal to do with the falling off in the building of new roads as compared with former years. Moreover, this, in connection with the stringency in money matters, renders it very difficult for new corporations to place their bonds, and, having no money or credit, they can do nothing.

**Iron Ore.**—The Ore trade continues much the same as noted for some time past; extreme dullness is still the order of the day.

**Pig Iron.**—The depression noted for some time past continues, and while hopes are entertained of an early change for the better the outlook is not particularly encouraging. There is no disposition manifested by consumers to depart from the hand-to-mouth policy, nor can it be expected until it has been more fully demonstrated that the market has touched hard pan. Furnace-men generally are confident that the lowest point has been reached, and this is supported by the fact that at present prices only those furnaces favorably located and having all the latest improvements can make both ends meet. The most important features to note are the reduced production and

comparatively light stocks. A large proportion of the furnace capacity, not only here but in the Shenango and Mahoning valleys, is idle, and the most of those in blast are working on contract, so that there is but little accumulation going on. It is admitted on all hands that stocks are light both in hands of producers and consumers, and the former are hopeful, in the event of an improved demand, of being able to establish an advance of 50¢ @ \$1 per ton. Good brands of metal may be quoted at \$15.50 @ \$16, cash; All-Ore do., \$17.50 @ \$18, 4 mos.; Foundry grades, \$17 @ \$20, cash, as to quality; Bessemer Iron, \$18.50 @ \$19, cash; Cold-blast Charcoal, \$27 @ \$28, cash.

**Muck Bar.**—There have been no sales reported recently, in the absence of which we continue to quote at \$29.50 @ \$30.50, cash.

**Manufactured Iron.**—The best brands are still quoted on a basis of 1.65¢ @ 1.75¢ rates for Bars, according to character of order, delivery, &c.; "Old-Rail" iron, it is probable, can be had below the rates quoted; buyers generally prefer to pay the difference. Those mills making a specialty of Bridge and Structural Iron are still pretty well employed, but the general Merchant Iron trade continues dull for the season. Skelp Iron has been sold as low as 1.75¢, and intimations are thrown out that it might be bought for less.

**Nails.**—The Nail trade is reported dull and unsatisfactory, unusually so for the season; in addition to a light demand prices are weak and irregular. Sales have been made during the past week at \$2.10, 60 days, 2¢ off for cash, although some manufacturers assert that up to the present time they have made no sales under \$2.15. They are of the opinion, however, that round-lot buyers can obtain all they want at the first-named quotation. Manufacturers report that they are a good deal annoyed by small buyers who send in orders for 5 to 10 kegs and expect to buy at the same rate with the jobber who orders by the carload. There is always a discrimination between the wholesaler and retailer.

**Wrought-Iron Pipe.**—The Pipe trade continues dull for the season, but it is hoped and expected that there will be a change for the better later on. No change in prices. Discounts on Black Butt-Welded Pipe, 30¢; on Galvanized do., 20¢; on Black Lap-Welded Pipe, 50¢; on Galvanized do., 35¢. For Selected Pipe, or Pipe cut to specified lengths, the discount is 5¢ less than the rates quoted.

**Steel.**—There is very little to note in regard to this important interest; trade only fair, while prices remain unchanged. Best brands of Refined Cast Steel, 9¼¢ @ 9½¢; do. Crucible Machinery, 5¢ @ 5½¢; Open-Hearth and Bessemer Machinery, 3¢ @ 3¼¢.

**Steel Rails.**—We are reported a sale of some 5000 tons, deliverable in Chicago, at equal to \$28, net cash, at works here. The feeling obtains that the market has struck bottom, and that buyers will incur but little risk in contracting at the price. A number of mills have shut down, refusing to sell at present rates, and with production reduced the market may take a turn upward some of these days unexpectedly.

**Old Rails.**—We can report a sale of 500 tons at \$21, and a lot of 100 tons at \$21.75. Sometimes a small lot for immediate delivery commands an outside price, as in some cases time is an important consideration.

**Railway Track Supplies.**—Prices are still quoted the same as for some time past, but a desirable order could, no doubt, be placed below the prices named. Spikes, 2.35¢, 30 days; Splice Bars, 1.65¢ @ 1.75¢; Track Bolts, 2½¢ @ 2¾¢.

**Crop Ends.**—American are still quoted at \$18.50 @ \$19.50, and Bloom Ends, 50¢ @ \$1 per ton less.

**Scrap.**—There is but little doing, and prices are little better than nominal. No. 1 Wrought Scrap, \$19 @ \$20 per ton; Old Car Axles, \$27 @ \$28; Wrought Turnings, \$16 @ \$17; Cast Boring, \$12 @ \$13 gross ton; Old Car Wheels, \$17 @ \$18, gross ton.

## Chicago.

Office of The Iron Age, 36 and 38 Clark St.,  
Cor. Lake St., Chicago, Aug. 4, 1884.

**Hardware.**—The week under review shows few points of interest. Being the closing week of the month, trade, if anything, was a trifle slower than the previous one. The demand is necessarily light and varied, embracing nearly the whole line of Hardware. Blacksmith and Sheet Iron goods have been slightly in the supremacy. The present month promises an improvement in trade generally, and opens with numerous inquiries for prices and catalogues of specialties. Buyers are cautious and will not be likely to load up very heavily at the start. Everything points to a good fall trade. Collections are fairly good, though money does not seem to be in abundance.

**Barb Wire.**—Calls for Barb Wire are on the increase. Trade is principally from the Southwestern territory as yet, but prospects indicate that before the month closes the demand will be largely improved from nearby trade. Manufacturers are talking combination prices, but no action has been taken. Quotations are 4½¢ for Painted, and 5½¢ for Galvanized.

**Nails.**—The demand for Nails does not seem to vary very much. Business is confined to small lots, which in the aggregate make a business beyond what would be expected when the conditions of the market are considered. Carload buyers have no faith in prices, and only order in quantity when they can secure advantage sufficient to cover the possible decline of a week or 10 days. For carload lots we again quote \$2.30, 2¢, 60 days, with reported sales at \$2.25. For less quantity \$2.35 is pretty uniform, and some of the leading houses insist that they get these figures, while others are not firm and would be likely to sell for less.

**American Pig Iron.**—The Pig Iron market is in that position where there is nothing to do but wait. Furnace-men are firmly sustaining their price against a slow

demand, and propose thus to continue. They are confident that the condition of stocks and the encouraging prospect of business in a general way will bring relief before a great while, though the market as yet gives no substantial encouragement. Manufacturers of various kinds come into the market with the expectation of discounting prices, but, failing in the attempt, withdraw, and, if necessary, order a carload or two to keep them running until they are fully persuaded that they can do no better.

There are others, however, who have courage enough to place orders. During the week one concern placed an order for 10,000 tons, to be delivered within six to nine months, while some other orders, ranging from 100 to 1000 tons, have been practically disposed of. In St. Louis there is considerable apathy in trade. The suspension of the St. Louis Iron Ore and Steel Company leaves about 15,000 tons of Pig that will seek a market. Much of the stock is held by banks, and at present there will be an uncertainty as to what will be done with it. An effort is being made to prevent it from coming on the market at a reduced price, but so long as it is unsold there will be a silent watch which will keep the market in a feverish state. Bessemer Pig is quoted by a St. Louis house at \$18.75, cash, Chicago delivery. Everything, so far as can be learned, points to an encouraging outlook for fall trade in this market. Confidence is slowly being established among consumers.

Furnace men are firm in their demands, and Irons are not accumulating at the present rate of production. With this background there is room for a bright picture of the future, and it is generally accepted that it will be realized. For carload lots, four months, we quote as follows: Lake Superior Charcoal, Nos. 1, 2 and 3, at \$21.50 @ \$22; Nos. 4, 5, and 6 at \$23; Lake Superior Coke at \$21; Lake Superior and Ohio, mixed, at \$20 @ \$21; Ohio Standard Black Band, No. 1, \$21 @ \$22; Southern, No. 1, at \$19.50, and No. 2 at \$18.50; Silvery Soft at \$18.50 @ \$20.50; Anthracite, No. 1, at \$22, and No. 2 at \$21.

**Scotch Pig.**—Nothing new to report on Foreign Iron. Market quiet and prices same as last week: Summerlee, \$25.50, cash, from yard, and \$24.50 to arrive; Glengarnock, \$27 from yard, and \$24 to arrive.

**Merchant Steel.**—Our remarks of last week would be entirely applicable to the week just closed. The market continues very quiet and irregular. There is little or no disposition on the part of even those who must buy to place orders for anything not actually necessary at the moment. There is really no demand except in a small jobbing way, and this does not amount to much when all told. Syndicate Steels are unsettled at nominally 7½¢. Manufacturers who use large quantities of Steel talk of the good prospects and predict largely-increased demand for their products during the next season, but are not buying material to any extent for their manufactures. Some of the Reapers men are making inquiries, but at this writing have not closed any contracts. We quote as follows for Best Refined grades from store:

	Per pound
Best Refined Cast Tool Steel.....	9 @ 10¢
Crucible Cast Machinery Steel.....	8¼ @ 8½¢
Open-Hearth Machinery Steel.....	8¼ @ 8½¢
Bessemer Machinery Steel.....	8 @ 8½¢
Open-Hearth Spring Steel.....	8¼ @ 8½¢
Tool-Steel.....	8¼ @ 8½¢
Bessemer Steel.....	8 @ 8½¢
Fire-Box and Boiler Steel.....	8 @ 8½¢

**Steel Rails.**—The Steel Rail market is quiet and weak. Mills are asking, as heretofore, \$35 @ \$37 for prompt delivery, but on their future business prices are less stringent. We learn of proposals made by somebody to deliver Rails during the last three months of the year at about \$32.50 for No. 1's, without getting the order, and we are yet in doubt whether this price has not been discounted. While all agree that there is no money in Rails at \$30, there seems to be a quiet hunt, nevertheless, for contracts at figures not far above. It is difficult to learn the full condition of the market at present.

**Old Rails.**—We have not learned of any sales during the week. The last quotation was \$19.50, at which several small lots changed hands. Speculators are asking \$20 @ \$20.50, without finding takers at any price.

**Structural Iron.**—The market is in about the same position as a week ago. A fair trade is doing from store for ordinary purposes, and mills are running pretty full at present on special contract sizes. Some new business is still in sight, and in all probability will be placed within a week or 10 days. We continue to quote combination prices, on which there is some change in discount that we have not been able to obtain, but which favors of a lower figure, on account of close competition on recent orders. Quotations, with ¼¢ @ ½¢ added for delivery from stock: Beams, \$3.60; Channels, \$3.60; T Iron, \$3; Angle Iron, \$2.50; Flitch Plates, \$2.50; Frieze Plates, \$2.70.

**Norway Bars.**—Some increase in the demand for Imported Bars was noticed a week ago, but no material change has occurred since then. Merchant trade is supplied at 3.9¢, and consumption at 4¢ rates.

**Galvanized Iron.**—Since last week's report a slight change has been noticeable in favor of increased trade. The month was more than usually dull, but the prospect for August is considered good. Buyers of considerable importance are again in the market—prices having been confirmed—and in all probability will place some fair orders during the month. The jobbing trade is about the same as it has been for several weeks. The approaching completion of several large buildings has brought into the market part of the cornice trade, who have not been very heavy buyers during the last two months. We make the following quotations: Juniata, 52½¢ off; Charcoal, 55¢ off, and Refined, 57½¢ off.

**Bar Iron.**—Bar Iron moves along very fairly. The demand for New Puddled Iron continues with marked regularity. Business has been much above the average of former years for the month of July, and August opens with the same encouragement. Many of the manufacturers prefer paying 7¢ more for long-time contracts on good Iron than take the risk of a much greater ad-

vance before the season of 1884 closes. One thing that has helped trade in this class of Iron was the firmness with which prices were sustained at the critical moment. Now consumers are satisfied that they can do no better, and no longer hesitate to contract for any supply that they are certain to want. For New Puddled Best Refined we quote 1.9¢ @ 2¢, and note less concessions weekly. For Common Iron, 1.7¢ @ 1.8¢ are the ruling quotations, while sales are made at figures which differ very much in buyers' favor. Upon all such sales, however, special reasons are assigned.

**Black Sheets.**—The movement of Black Sheets is gradually increasing, and, from present appearance, will during the month develop into a fair trade. So far sales have been chiefly confined to the small jobber in Stoves and Pipe and articles of small manufacture. Heavy buyers are making vigorous efforts to influence the market in their favor, but makers are pretty stiff and determined to get a better price if it is to be had. We renew our quotations from store: Nos. 10 to 14 at \$2.60 @ \$2.70; No. 24 at \$3; Nos. 25 and 26 at \$3.10, and No. 27 at \$3.20, from store.

**Old Wheels.**—There is so little demand for Old Wheels that we cannot give more than a nominal quotation. Foundries are offering \$18, but no transactions are reported at these figures.

**Scrap Iron.**—The market continues overstocked and prices necessarily weak. Mills continue to offer \$17 for No. 1 and \$12 for No. 2, but are grading exceedingly close. We make the following quotations as dealers' purchasing prices: No. 1 Wrought Scrap, ½ net ton, \$16; Cast Scrap, ½ net ton, \$13; No. 1 Stove Plate Scrap, ½ net ton, \$8; Wrought Turnings, ½ ton, \$9; Cast-Iron Boring, \$7; Old Plow Steel, \$9; Tool Steel, ½ ton, \$17; Steel Tire, ½ net ton, \$14.50; Buggy Springs, ½ net ton, \$16; Malleable Scrap, \$5.

## Chattanooga.

Office of The Iron Age, Carter and Ninth Sts.,  
CHATTANOOGA, August 4, 1884.

General trade is slightly improved. There is more confidence in the general tone. Stocks of all kinds are flat down to the absolute necessities of dealers and producers. Several large building enterprises held in abeyance since early spring are again taking form, and most of them will materialize during the late summer and fall. Lumber is somewhat stiffer, though not improved in price. Contractors in all lines report a better outlook. The weather is cooler. Crops are in most prosperous condition. Provisions are cheap, favoring workmen whose wages have been reduced. Labor is very fully employed.

**Pig Iron.**—The lowness of stocks tends to strengthen business, though prices have not improved. Founders report a considerable number of orders for building and other castings ranging from 50 to 200 tons, and the metal is bought at current quotations to fill the contracts. A good many of our furnaces are holding Iron on account of the reported shaky condition of some large dealers who offer to take big bills. We note sales of round lots of No. 1 Foundry at \$16, cash, at furnace; other grades run from \$13 to \$15. We quote small lots, 60 days: No. 1 Foundry, \$17 @ \$18; No. 2 Foundry, \$16.50; Gray Forge, \$14 @ \$15; White and Mottled, \$13 @ \$14; Car-Wheel Metal, \$22 @ \$24.

**Ores.**—We quote Fossiliferous Ores, averaging about 50% Metallic Iron, \$1.75 per ton, delivered at river landings; higher qualities, \$2. Brown Hematite, \$2 @ \$2.25 on cars at furnace.

**Miscellaneous Articles.**—Old Rails, \$16; Wrought Scrap, \$11 @ \$14; Old Wheels, \$16; Cotton Tie Clippings, \$10. Business in this list is extremely light, and most of the articles may be set down as nominal.

**Merchant Iron.**—Bar is dull at \$1.70 for car lots; Spikes, \$2.35; Bolts, \$2.75 @ \$3; Splices, \$1.70.

**Barb Wire.**—Four-Point and Cambria Link, Galvanized, 6¢ per lb.

**Coal.**—We quote Fancy Lump at \$3; Common, \$2.50; run of mine to manufacturers, \$1.50 @ \$1.75 at mills.

**Coke.**—We quote at \$2.12 @ \$2.30 at furnace; Foundry Coke at 8¢ @ 10¢ per bushel.

## Cincinnati.

AUGUST 2, 1884.—**Pig Iron.**—Transactions are confined to immediate wants, which are small. While some makers are inclined to force sales, others hold prices firm, expressing willingness to trust to future developments. The carefully prepared statistics show production to be in excess of consumption for June and July. Quotations for the past week:

Hanging Rock Charcoal Foundry, No. 1.....	\$22.00 @ .....
No. 2.....	21.00 @ .....
Others, from \$1 to \$2 less.....	18.00 @ 19.35
Hanging Rock Coke Foundry.....	18.00 @ 19.35
Virginia, Tennessee and Alabama, 80¢ @ \$1 less.....	
Hanging Rock American Scotch, No. 1.....	19.25 @ .....
No. 2.....	17.75 @ .....
Hanging Rock Silver-Gray Softeners, No. 1.....	19.25 @ .....
No. 2.....	17.75 @ .....
Others, \$1 @ \$1.00 less.....	

No sales of Car-Wheel or Forge reported.

## Louisville.

GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of August 2, 1884: The market shows no animation. Sales are light and confined to quantities required for immediate consumption. The amount of Iron being consumed is rather above the average for this time of year. Some of the foundries are working full. We quote, for cash, in round lots, as below:

	Per ton
Southern Coke, No. 1, Foundry.....	\$17.50 @ \$18.00
No. 2.....	16.00 @ 16.50
Hanging Rock Coke, No. 1, Foundry.....	18.00 @ 18.50











450, Crayons and Chalk.....	Net
451, Door Hangers.....	25
452, Farm and School Bells.....	30
453, Church Bells.....	35
454, Double Pointed Tacks.....	35
455, Basket and Sloop Staples.....	Net
456, Steel Spring Staples.....	25
457, Electrician.....	25
458, Blind.....	25
459, Bed Spring.....	25
460, Pruning Shears.....	25
461, Rockdale Pruner.....	Net
462, Grape Picker.....	Net
463, Wire Nail.....	35
464, Steel Escutcheon Pins.....	35
465, Finishing and Molding Nails.....	35
466, Fly Traps.....	35
467, Corn Poppers.....	35
468, Dish Covers.....	35
469, Spool Wire.....	35
470, Dog Muzzles.....	35
471, Rat Traps.....	35
472, Hunter's Sifters.....	35
473, Horse and Ox Muzzles.....	35
474, Mouse Traps.....	35
475, Rat Traps.....	35
476, Whip Socks.....	35
477, King and Queen Carpet Sweepers.....	35
478, Corner Irons and Shelf Supporters.....	Net
479, Shovels.....	35

## THE EAGLE LOCK COMPANY,

Terryville, Conn., and 98 Chambers street, New York, have been putting a number of new goods on the market, some of which are represented in their advertisement which occupies page 20. Among the goods there represented is the Eureka Padlock, which is made in the seven sizes shown, from 1 1/2 inch to 2 1/2 inch. This lock, it will be perceived, is a new departure in the shape of the lock and the shackle and the working of the lock and shackle. It is made with flat steel keys, is self-locking, and has a spring shackle that flies open when unlocked by the key. They are neatly made, japanned, and put on the market to take the place of the old style and medium-priced locks. The list is as follows, subject to the regular discount of 25 per cent.:

No. 4017, 1 1/2 inch.....	per doz., \$1.25
No. 4018, 1 3/4 inch.....	1.50
No. 4019, 1 7/8 inch.....	1.50
No. 4020, 2 inch.....	2.00
No. 4021, 2 1/4 inch.....	2.00
No. 4022, 2 1/2 inch.....	2.50
No. 4023, 2 3/4 inch.....	2.50
No. 4024, 3 inch.....	3.00

The same manufacturers are also putting on the market a line of entirely new Mortise Flat Key Drawer Locks. The key guide is made adjustable for different thicknesses of wood from 3/4 inch to 1 1/4 inch. The method of construction brings the end of the key guide flush with the escutcheon on the wood, a point which will be appreciated by the trade. They are also making new styles and designs of Keys, flat steel and fine metal, as well as common iron Keys. They call attention to their assortment in this line as the largest in the market. Within a short time they have also commenced making a Wrought Brass and a Wrought Steel Trunk Lock of the style of the well-known Excelsior Trunk Lock, which has heretofore been made of cast brass and bronze metal. They are able to offer this new article at a reduced price. A line of Brass Gilt Finished Fancy Railing for fine furniture, such as sideboards, cabinets, &c., is being introduced by this company, and will be sold especially to furniture manufacturers and dealers in Furniture Hardware.

A. J. JORDAN.

The following communication from Friedmann & Lauterjung, 91 Chambers street, New York, will be of interest to our readers as announcing a change which they have made in regard to their St. Louis business, the exclusive sale of their goods in the territory indicated being placed in the hands of A. J. Jordan, who has been their sole agent for a number of years, and is widely known in the trade:

New York, July 28, 1884.

To the Editor of the Iron Age: We beg leave to inform our customers and the trade in general that we have sold to Mr. A. J. Jordan all the interest we held in the wholesale Cutlery house at St. Louis, Mo., heretofore conducted under the firm name of Friedmann & Lauterjung—A. J. Jordan, sole agent. Mr. Jordan still has the exclusive sale of our goods, including our well-known Electric Brads, in the territory he has heretofore controlled, and orders for same should be addressed to him and will receive prompt attention. Thanking our customers for their past patronage, we trust the same will be continued toward Mr. Jordan. Respectfully, yours,

FRIEDMANN &amp; LAUTERJUNG.

## MISCELLANEOUS PRICES.

Hobart B. Ives, New Haven, Conn., has sent us his descriptive price list of Mortise Door Bolts, a line of goods of which he makes a specialty. It shows 23 styles of these Bolts, of different patterns to match various styles of door trimmings. The discount on these goods, as sold by John H. Graham & Co., his agents, is 55 and 10 per cent., which will be recognized by the trade as a low figure on a line which is received with much favor.

The Athol Machine Company, Athol, Mass., under date of August 1, 1884, have issued the following discount sheet, from which it will be seen that a material reduction is made in the price of some of their goods. They report trade as having been quiet for the past two or three months, but as now opening satisfactorily, with good promise of a fair business. The discount sheet is as follows, an additional 2 per cent. being given for cash in 10 days, or not 60 days:

American Meat Choppers.....	40
Domestic Presses.....	40
Simpson's Vices.....	40
Amateur's Vices.....	40
Farmer's Vices.....	40
Standard Vices.....	40
Woodworker's Vices.....	40
Carpenter's Vices.....	40
Woodworker's Best Vices.....	40
Delivered on cars at factory.....	40

In their advertisement on page 8 John H. Graham & Co., 113 Chambers street, New York, call attention to their Universal Corn

Husker, an illustration of which is there given. This article is made entirely of brass and without leather straps, loose rings, web or set screws, and is spoken of as meeting the demands of the trade and finding a large sale. It is made of only one size, which, however, by an adjustable fixture will fit any hand. It is sold at \$24 per gross, subject to a discount of 25 per cent.; in lots of five gross a discount of 30 per cent. is given.

FRANCIS AXE COMPANY.

On page 16 our readers cannot fail to observe the striking advertisement of the Francis Axe Company, Buffalo, N. Y., who are represented in this city by T. P. Burke, 100 Chambers street. These manufacturers, we are informed, have one of the most completely equipped Axe factories in the country, and as all their machinery is new and made expressly to their order, they have the best facilities for turning out the goods that are required by their extensive trade. They inform us that they do not undertake to compete with inferior makers, but will furnish a high-grade tool at a fair price. They are intending to make a specialty of All Steel All Polished Axes, which they mention that they are putting on the market at very favorable figures. In addition to the patterns illustrated, they make Double Bitted Axes, Wedge, Peeling, and Fireman's, and are in a position to make to order any desired styles.

## ITEMS.

On page 45 will be found the advertisement of the Pollett Lantern and Manufacturing Company, Rochester, N. Y., a description of whose lantern we published in Hardware Novelties a few weeks ago. These manufacturers report trade for this article as very satisfactory, and mention their facilities for making it and their other goods, having new patents and improved machinery. They direct attention also to the Pollett Lantern Dashboard Reflector, an article which is meeting with favor. They lay special emphasis on the workmanship and finish of their goods.

Neumeyer's Excelsior Window Bead Fastener, which is made under patent dated March 4, 1884, by Brobst & Neumeyer, Macungie, Pa., is illustrated in their advertisement on page 40. The object of this Fastener is to secure window beads to the casing in such a way that they can be removed, replaced and fastened readily, thus avoiding the disfiguring of paint or bead when fastening or taking off. By the aid of the illustration in the advertisement the operation of this simple fastening will be readily understood.

We are advised that Davis W. Shuler, manufacturer of Steel Springs, Amsterdam, New York, has appointed W. Dodman, 107 Chambers street, as direct representative, who will at all times have the extreme factory prices and terms. We have also received Mr. Shuler's catalogue showing the variety of Springs manufactured, and a circular calling attention to the Shuler Corn Springs.

On page 23, Yerkes & Plumb again direct the trade's attention to their line of goods, illustrating some important styles.

## SARGENT &amp; CO.

Sargent & Co., New York and New Haven, have ready for delivery their new illustrated Catalogue of Hardware, a book of exceptional excellence, which will be highly valued by the trade. It is an imposing volume of a somewhat larger page than their last, tastily bound with brown cloth sides, leather back and red edges, finely printed and fully illustrated. The book is not bulky, but of convenient size for practical use, and is remarkable for the satisfactory manner in which it represents compactly, clearly and with artistic effect the large variety of goods which it covers. More than half of the volume, about 600 pages, is occupied with the very extensive line of which Sargent & Co. are the manufacturers, exhibiting their latest additions. Turning to the latter part of the volume, which is devoted to the display of General Hardware, we are impressed with the compactness with which the illustrations and lists are given without any sacrifice of clearness. We do not know of any catalogue in which as large an assortment of goods is displayed in the same space with so much skill and taste. The numbers which designate the different goods are in nearly all cases printed in a black-faced letter, which gives a suitable prominence and adds to the convenience of consulting the catalogue. Special pains have also been taken to secure a harmonious effect in grouping the cuts, and without interfering with the illustration of the goods the usually stiff arrangement is sometimes dispensed with, as the cuts are interlocked or overlapped. An instance of this may be found on page 790, in the display of the Williams Manufacturing Company's Reamers, or Stearns' Saw Vices, page 810. The list for Wire Nails and Escutcheon Pins, with a cut full size of the leading sizes, is given very attractively on page 703. The arrangement of Diston's Hand Panel and Rip Saws is satisfactory, giving, as it does, in an exceedingly condensed form the cut, description and price of each line. By this arrangement, for example, Nos. 12, 9, 8, 7, D8 and 76 are fully represented with illustrations on a single page. The display of Squares on pages 539, 540 and 541 is another instance of the combination of clearness, condensation and typographical beauty; but it is needless to specify further illustrations of what is a characteristic of the book as a whole. Its

index, we may mention, is very full and satisfactory, as the goods are so freely indexed and cross indexed that there is no difficulty in finding a given article. The volume, which is very creditable to the house which issues it, will be highly appreciated by the trade, and doubtless be influential in determining the arrangement and character of catalogues issued by other houses. It is now, we believe, ready for delivery, and will be sent to customers with the first lot of goods ordered, or, if desired by them, expressed to their address.

Sargent & Co. have also issued, to go with their new catalogue, the following Discount Sheet, which is subject to an additional discount of 10 per cent. for prompt cash:

		Dis. percent.
No. 20, Fast Joint Butts.....		40&10
No. 50, Loose Joint Butts.....		60
No. 152, ".....		55
No. 153, ".....		60
No. 156, ".....		60
Nos. 157 and 159, Loose Joint Butts.....		60
No. 478, Boston Finish Butts.....		75
No. 472, Berlin Bronzed Butts.....		75
No. 475, ".....		75
No. 478, ".....		75
Nos. 897, 899, Bronze Butts.....		60
No. 875, Bronze Butts.....		60&10
Nos. 895, 898, Bronze Butts.....		60&10
No. 543, Polished Brass Butts.....		60
No. 893, Bronze Metal Butts.....		60
No. 894, ".....		60
No. 1563, Polished Brass Butts.....		60
No. 1569, Bronze Metal.....		60
No. 1804, ".....		60
No. 896, Bronze Cap Butts.....		60
No. 782, Nickel.....		60
Loose Pin Butts, Nos. 42, 43, 46.....		60
Loose Pin Butts, Nos. 142, 143, 145.....		60
No. 82, Loose Pin Butts.....		60
No. 137, ".....		75
Loose Pin Butts, Nos. 235, 485.....		70
" " Nos. 239, 336, 486, 487.....		70
" " Nos. 836, 839.....		60&10
" " No. 894.....		60&10
" " Nos. 545, 842.....		55
" " Nos. 543, 843, 844.....		60
" " Nos. 1543, 1544, 1544.....		60
Mayer's Hinges.....		60
Parliament Butts.....		60
Inside Shutter Hinges.....		60
Pin Hinges.....		55
L. P. Surface Butts.....		60
Refrigerator Hinges.....		60
Surface Spring Hinges.....		60
Mortise.....		50
Royal Spring Hinges.....		60
Victor Door Springs.....		60
Champion Door Springs.....		60&10
Torrey.....		75
S Door Springs.....		75
Rubber Door Springs.....		60
Strap and T Hinges.....		60&2
Crate Hinges.....		60&2
Hinge Hasps.....		60&2
Crate Hasps.....		60&2
Galvanized Strap and T Hinges.....		60&10
Trap Door Hinges, No. 20.....		60
No. 100, Fast Joint Plate Hinges.....		Net
6, 8, 10 and 12 inches, 7 1/2 D.....		\$5.75
14 inches and larger.....		4.75
No. 162, Loose Joint Plate Hinges.....		Net
6, 8, 10 and 12 inches, 7 1/2 D.....		\$5.75
14 inches and larger.....		4.75
No. 108, Hook Hinges.....		Net
8, 10 and 12 inches, 7 1/2 D.....		\$5.75
14 inches and larger.....		5.50
No. 79, Welded Hook Hinges.....		60
No. 78, ".....		60
No. 98, Hook Hinges.....		Net
8, 10 and 12 inches, 7 1/2 D.....		\$5.75
14 inches and larger.....		4.75
No. 86, Hook and Eye Hinges.....		60
Roller Plate and Raised Hinges.....		60
Roller Blind Hinges.....		60
Roller Center Blind Hinges.....		60
Blind Hinges, Nos. 1, 3, 5.....		75
" " Nos. 11, 13.....		75
" " No. 12.....		75&10
Wrought Turn Buckles.....		60
Macrell's Blind Fasteners.....		60
Drops and Pins.....		60
New York State Gate Hinges.....		60&10
Reversible Gate Hinges.....		60&10
Reversible N. E. Gate Hinges.....		60&10
Western Gate Hinges.....		60&10
Japanned ".....		60&10
Self-Lock ".....		60&10
Self-Lock ".....		60&10
American ".....		60&10
Gate Sockets.....		60&10
Gate Latches.....		60&10
No. 0, Gate Latches.....		40
No. 15, ".....		40
No. 16, Wrought Gate Latches.....		60
Barn Door Rollers.....		60&10
Barn " Hangers.....		60
Wood Track B. D. Hangers.....		60
N. E. Barn Door.....		60&10
Steel Barn Door.....		65
Barn Door Stays.....		60
Barn " Rail, Nos. 2 to 14.....		60
Barn Door Rail, Nos. 24 to 47.....		60
Sliding Door Rail.....		60
Tower Bolts.....		60
Barrel.....		60
Wrought Barrel Bolts.....		60&10
Light ".....		60
Barrel Bolts.....		60
Brass Barrel Bolts.....		60
Elm City Barrel Bolts.....		60
No. 330, Neck Bolts.....		60
American ".....		60
No. 329, ".....		60
Nos. 325, 326, Neck Bolts.....		60&10
No. 316, Wrought Spring Bolts.....		60&10
Wrought Spring Bolts.....		60&10
Square.....		60&10
No. 300, ".....		60
Floor Plates for Square Bolts.....		60
Staples.....		60
Cast Brass Square Bolts.....		60
Square.....		60
" " Cased Bolts.....		60&10
No. 332, Shutter Bolts.....		60
No. 337, Shutter Bolts (add new size 4-inch, per doz., \$5.75).....		60
No. 338, Shutter Bolts.....		60&10
Shutter Bolts.....		60&10
No. 390, Round Case Foot Bolts.....		60&10
Nos. 391, 392, Spring.....		60&10
Bottom Bolts.....		60
Lease Flat.....		60
Chain.....		60&10
Mortise Door Bolts.....		60
Ship Flush Bolts.....		60
Brass and Plated Flush Bolts.....		60
Wrought Flush Bolts.....		60
Bronzed.....		60
Bronzed Flush Bolts, Nos. 94, 97 (change the first size of No. 94 to 6-inch instead of 9-inch).....		60
B. M. and Imperial Flush Bolts.....		60
Bronze Metal Flush Bolts.....		65
Mortise Flush Bolts.....		65
Extension.....		75
Cupboard Bolts.....		60
Door Buttons.....		60
Cupboard Latches.....		60
" " Catches.....		60
" " or Locker Catches.....		60
Elbow Catches.....		60
Barn Door Elbow Catches.....		60
Lever Cupboard Catches.....		60
Brass and Plated Cupboard Catches.....		60
Show Case Catches.....		60
French Window Catches.....		60
Show Case Catches, Nos. 31, 33.....		60
Rural Cupboard Catches.....		60
Japanned.....		60
Cupboard Catches.....		60
Window Catches.....		60
Transom Catches.....		60
Cupboard Turns.....		60
Door Catches.....		60
Case.....		60
Screen Door Catches.....		60
Chain Door Fasteners.....		60
Letter Box Plates.....		60&10
Door Bells.....		60
Leaky Door Bells.....		60
Bell Pulls.....		60
Slide Bell Pulls.....		60

House Bells on Carriages.....	45
Alarm Door Bells.....	60
Door Knockers.....	60
Clock Springs.....	60
Bell Cranks.....	60
Mortise Bell Cranks.....	60
Pulley.....	60
Roxin's Latches.....	60
Bronzed Door Handles.....	60
Japanned Door Handles.....	60
Barn Door Latches.....	60
Barn Door Hasps and Latch.....	60
Japanned Store Door Handles.....	60
Bronzed.....	60
Store Door Handles.....	60
Bronze Metal Store Door Handles.....	60
Store Door Handles and Lock.....	60
Flush Barn Door Pulls.....	60
Door Pulls.....	60
Push Plates.....	60
Drawer Pulls.....	60
Drop Handles and Escutcheons.....	60
Japanned Lifting Handles.....	60
Lifting Handles.....	60
Brass Ring Handles.....	60
No. 25, Shelf Box Handles.....	60
No. 10, Brass Drawer.....	60
No. 15, Brass Trunk.....	60
No. 30, " ".....	60
Flush Rings.....	60
Brass Flush Drawer Handles.....	60
Flush Chest Handles.....	60
" " Trap Door Rings.....	60
" " Chest Handles.....	60
Chest Handles.....	60
Tub Handles, Nos. 15 and 115.....	60
Wrought Tub Handles.....	60
Wrought Chest Handles.....	60
Nos. 71 to 76.....	60
Nos. 171 to 176.....	60
Nos. 1 to 6.....	60
Nos. 101 to 106.....	60
Clothes Line Hooks.....	60
" " " " or Cleats.....	60
Hat Rack Hooks.....	60
Store Rack Hooks.....	60
Harness or Baggage Hooks.....	60
Harness Hooks.....	60
Hotel Hooks.....	60
Coat and Hat Hooks.....	60
Wardrobe Hooks.....	60
Japanned Screw Hat Hooks.....	60
Brass Hat Hooks.....	60
Selling Hooks.....	60
Chandelier Hooks.....	60
Braced Screw Hooks, No. 306, &c.....	60
Lamp Hooks.....	60
Brass Screw Hooks.....	60
Wire Drive.....	60
Brass.....	60
Brush or Duster Hooks.....	60
Coppered Screw.....	60
Picture or Mirror.....	60
Cup Hooks.....	60
Hooks and Eyes.....	60
Cabin Door Hooks.....	60
No. 100, Safety Gate Hooks.....	60
Gate Hooks and Eyes, Nos. 40, 1040.....	60
Cornice Hooks, Nos. 30, 35.....	60
Plates for Cornice Hooks.....	60
Stair Rod Eyes.....	60
Bird Cage.....	60
Screw Eyes.....	60
" " Hooks.....	60
" " No. 2703, &c.....	60
Wire Cup Hooks.....	60
Left Hooks.....	60
Wire S Hooks.....	60
Roller Ends.....	60
Shade Brackets.....	60
Molding Hooks.....	60
Porcelain Center Curtain Pins.....	60
Brass Head Picture Nails.....	60
Porcelain Head Picture Nails.....	60
" " Knobs.....	60
Drawer Knobs, Nos. 5 and 7.....	60
" " Stove.....	60
" " No. 5.....	60
Shutter Knobs.....	60
Sash.....	60
Kettle.....	60
Sash Lifts.....	60
" " Lifts.....	60
Flush Sash Lifts.....	60
Window Pulls.....	60
Sash Pull Plates.....	60
Shutter Plates.....	60
Window Spring Bolts.....	60
" " Bolt Sockets.....	60
" " Springs, Nos. 0 to 7.....	60
" " Nos. 17, 19.....	60
Brass Window Bolts.....	60
Sash Fasteners and Props.....	60
Fasteners.....	60
Transom Lifters.....	60
Shutter Screws.....	60
" " Lifts.....	60
Stubs and Plates.....	60
Sash Rollers.....	60
Shutter Shafts.....	60
Hatfield Pattern Shafts.....	60
Sliding Door Stops.....	60
Elastic Base Knobs, Wood.....	60
" " Iron.....	60
Sash Cord Irons.....	60
Axle Pulleys.....	60
Dumb-Waiter Pulleys.....	60
Ceiling Pulleys.....	60
Hot-House Pulleys.....	60
Upright Pulleys.....	60
Side Pulleys.....	60
Screw Pulleys.....	60
" " Sash Pulleys.....	60
Swivel.....	60
Clothes Line Pulleys.....	60
Tackle, or Awning Pulleys.....	60
Well Wheel.....	60
Hay Fork Pulleys.....	60
Brass Side Pulleys.....	60
Upright Pulleys.....	60
Screw Pulleys.....	60
Line Cleats.....	60
Foot Scrapers.....	60
Plain Shelf Brackets.....	60
Shelf Brackets.....	60
Hand Rail Brackets.....	60
" " Plates.....	60
" " Screws.....	60
Washers, 84 cents from list.....	Net
Corner Irons.....	70
Ridge Nails.....	70
" " Rivets.....	70
Wagon Nails.....	70
Wrought Staples.....	70
Hooks and Staples on Plate.....	70
Hasps and Staples.....	70
No. 60, Wagon Bow Staples.....	70
No. 61.....	70
Wagon Stake Irons.....	70
S Hooks.....	70
D Links.....	70
Open Links.....	70
Awning Hooks.....	70
Sign.....	70
Pipe.....	70
Leader.....	70
Wire Meat Hooks, 45, 44, 45.....	70
Wrought Meat Hooks.....	70
Hammock Hooks.....	70
Well Wheel Hooks.....	70
Swing Hooks.....	70
Eye Bolts.....	70
Screw Hooks.....	70
Trap Door Rings, Nos. 50 to 57.....	70
Hitching Posts.....	70
" " Hooks and Rings.....	70
" " Post Caps.....	70
" " Rods.....	70
" " Chains.....	70
Halter Chains.....	70
Breast.....	70
Rein.....	70
Shaw Slide-Lock Snaps.....	70
Double Lock Snaps.....	70
Covered Spring Snaps.....	70
German Snaps.....	70
Sargent's Patent Snaps.....	70
Lock Eye Snaps.....	70
Chain.....	70
Halter Trimmings or Cattle Ties.....	70
Rope Halter Leads.....	70
" " Horse and Cattle Ties.....	70
Ring.....	70
Shaw Slide Leaders.....	70
" " Bow Pins.....	70
" " Balls.....	70
" " Mark Snaps.....	70
Marriage Knots.....	70
Spikes.....	70
Deep Balls.....	70
Wrought Cow Balls.....	70
Chain.....	70
Wine Boxes.....	70





**L. COES' Genuine and Mechanics, PATENT Screw Wrenches**  
MANUFACTURED BY  
**L. COES & CO.,**  
Worcester, Mass.  
ESTABLISHED IN 1839.



Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest wrench in the market. None genuine unless stamped.

**L. COES & CO.,**  
Worcester, Mass.  
Warehouse,  
97 Chambers and 81 Reade Sts.  
NEW YORK.  
**DURRIE & McCARTY,**  
Sole Agents



**1884. PENNSYLVANIA LAWN MOWER.**

Has no Equal Surpassing all others, and pronounced "THE BEST."

For descriptive catalogue and prices write to

LLOYD & SUPPLEE HARDWARE CO., Philadelphia.  
DURRIE & McCARTY, New York.  
AMES PLOW CO., Boston, Mass.  
PRATT & CO., Buffalo, N. Y.  
SIMMONS HARDWARE CO., St. Louis, Mo.  
HAMILTON & MATTHEWS, Rochester, N. Y.  
MARKLEY, ALLING & CO., Chicago, Ill.  
HUNTINGTON, HOPKINS & CO., Sacramento and San Francisco, Cal.  
R. A. CULTER & CO., Peoria, Ill.  
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WM. FRANKFURTH & CO., Milwaukee, Wis.

WALTER S. LUDLOW, Cincinnati, Ohio.  
LLOYD & CLARKE, La Crosse, Wis.  
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LOGAN, GREGG & CO., Pittsburgh, Pa.  
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OTT BROS. & CO., Wheeling, W. Va.

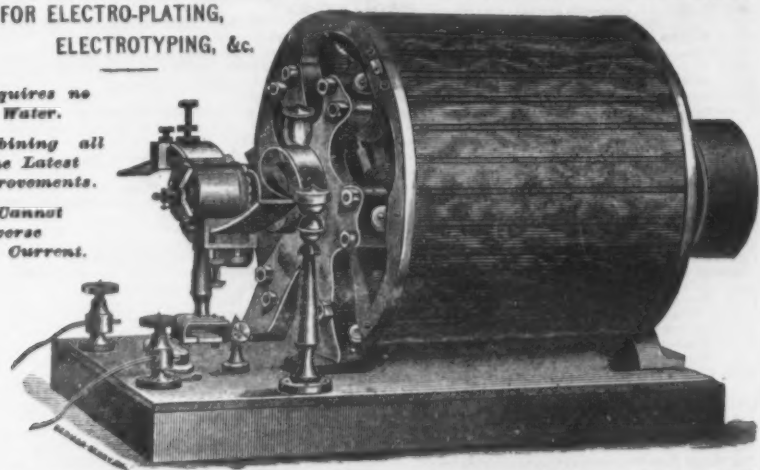
**PURE TURKISH EMERY.**  
**WALPOLE EMERY MILLS,**  
South Walpole, Mass.

**NIMICK & BRITTAN MFG. CO.,**  
PITTSBURGH, PA.,  
**BUILDERS' FINE HARDWARE,**  
Embracing Door Locks, Latches, Knobs, Butts, Sash Locks, &c.  
**IMPROVED ROSE ESCUTCHEON KNOBS,**  
In GENUINE BRONZE & IMITATION BRONZE.  
**PADLOCKS.**

TEA, COUNTER, UNION AND PLATFORM SCALES.  
Catalogues and Lists furnished on application.  
**JOHN H. GRAHAM & CO., Agents, 113 Chambers St., New York.**

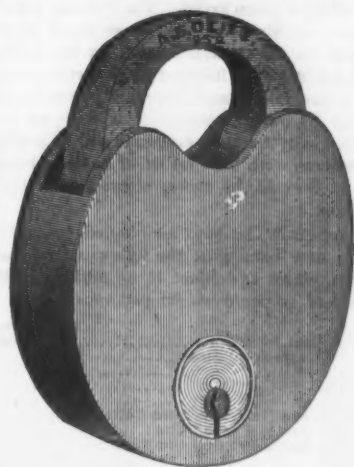
**THE AMERICAN DYNAMO-ELECTRIC MACHINE**  
FOR ELECTRO-PLATING,  
ELECTROTYPING, &c.

Requires no Water.  
Combining all the Latest Improvements.  
Cannot Reverse Current.



**THE ZUCKER & LEVETT CHEMICAL CO., Sole M'trs.**  
Manufacturers and Importers of NICKEL PLATING SUPPLIES,  
538 to 564 West 16th Street, NEW YORK.

**A. E. 'DEITZ. "Greenfield" Forged Ox Shoe.**



**DURRIE & McCARTY, Agents,**  
97 Chambers & 81 Reade Sts., New York.



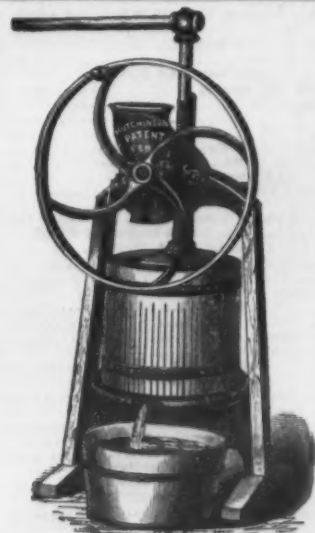
**CAST BRASS HARDWARE**  
FOR  
**ICE HOUSES AND REFRIGERATORS**  
Manufactured and kept in stock by  
**W. & J. TIEBOUT.**  
Manufacturers of  
**BRASS, GALVANIZED & SHIP CHANDLER HARDWARE,**  
Nos. 16 & 18 Chambers St., NEW YORK.



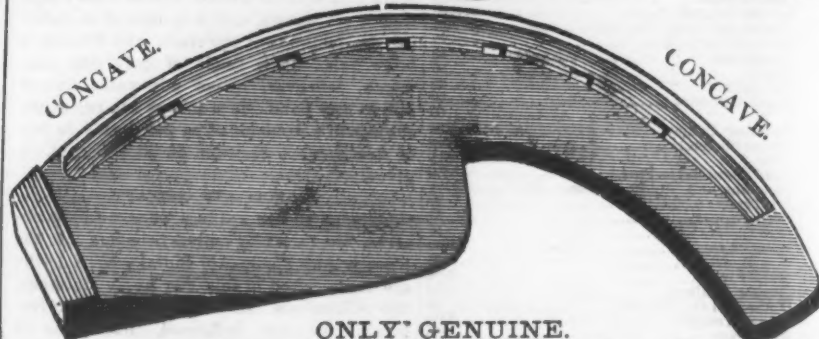
ALWAYS GIVES THE  
UTMOST SATISFACTION  
**Main Belting Co.,**  
Manufacturers of  
**THE LEVIATHAN COTTON BELTING.**

Unsurpassed for Strength, Durability and Cheapness.  
Made to any Length, Width and Strength.  
**Main Driving Belts.**  
Guaranteed to Run Straight, Even Through out.

No Cross Joints, Unaffected by Damp. Clings well to the Pulley. Has no equal. In fact, is THE BELT.  
**MAIN BELTING COMPANY,**  
S. W. cor. Ninth and Reed Sts., Philadelphia.  
Also  
248 East Randolph St., CHICAGO.



**Hutchinson's Family Mill**  
No. 0, \$15.00. No. 1, 18.00.  
Excelsior, Jr., Cider Mill, \$22.50.  
Union " " 30.00.  
U. S. " " 50.00.  
Presses from \$5 to \$35.00. Press Screws, Wrought and Cast Iron, from \$3 to \$30. Discount to Dealers.  
**The New York Plow Co.,**  
55 BEEKMAN ST., NEW YORK.



**ONLY GENUINE.**

Made under the Parker and Colburn Patents, from Burden's H. B. and S. Iron. Nail holes punched, and every shoe perfect.  
The Parker and Colburn Patents cover broadly the dies in which the Shoes are forged. We are the only licensees, and all parties are cautioned against using either of the dies or the forging mechanism or processes so protected, as our rights under said patents will be fully maintained.  
While we can furnish either the Concave Shoe with One Calk, or the Flat Shoe with Two Calks, we emphatically recommend the Concave, with one Calk, for the following reasons, viz:  
First.—Because the entire bearing of the shoe should come upon the shell of the hoof, and not upon the ball or tender part of the foot, as is necessarily the case with the flat shoe. This principle is recognized by all experts in the shoeing both of oxen and horses, and will prevent a tendency to sore-footedness.  
Second.—Because by having one calk only, the shoe can be cut off or lengthened and fitted more perfectly to the foot.  
Third.—Because by having one calk only, the shoe can make the other calk at any angle he desires.

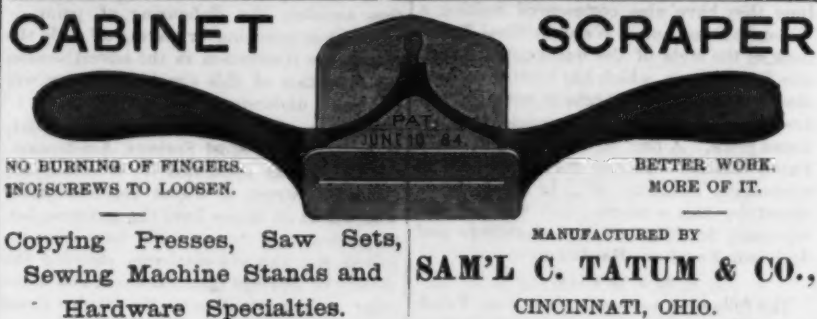
No. 1, Full Length, Concave, 5 inches, Weight, per Set of Eight Shoes, 3 pounds.  
" 2, " " " 3 1/2 " " " " 3 1/2 " "  
" 3, " " " 6 " " " " 5 " "  
" 4, " " " 6 1/2 " " " " 5 " "  
Packed in boxes or kegs of 100 pounds, half each rights and lefts. Full weight, and no charge for packages.

**PRICES.**  
For orders of One Ton, or more, 9 cts. per pound.  
" 100 lbs. " 9 1/2 " "  
" 500 " " 10 " "  
" Less than 500 lbs. " 10 1/2 " "  
Terms, Net Cash, 30 days. Made only by

**MILLERS FALLS CO.,**  
74 CHAMBERS ST., NEW YORK.



**CHAMPLAIN Forged Horse Nails.**  
MANUFACTURED BY THE  
**NATIONAL HORSE NAIL CO.,**  
Vergennes, Vermont.  
HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST  
NORWAY IRON AND WARRANTED.  
WAREHOUSE  
97 CHAMBERS AND 81 READE STREET'S NEW YORK.  
**DURRIE & McCARTY, Sole Agents.**



**CABINET SCRAPER**  
NO BURNING OF FINGERS.  
NO SCREWS TO LOOSEN.  
BETTER WORK.  
MORE OF IT.  
Copying Presses, Saw Sets,  
Sewing Machine Stands and  
Hardware Specialties.  
MANUFACTURED BY  
**SAM'L C. TATUM & CO.,**  
CINCINNATI, OHIO.

H. B. SEIDEL, President. W. HASTINGS, Vice-Pres. and Gen'l Mgr. E. T. CANBY, Sec. and Treas.  
**THE SEIDEL & HASTINGS CO.,**  
WILMINGTON, DELAWARE,  
New York Office, No. 90 John St.; Entrance on Gold St.,  
MANUFACTURERS OF  
**BEST CHARCOAL BOILER PLATES,**  
AND PLATE IRON GENERALLY.  
ALSO BEST QUALITY HOMOGENEOUS STEEL PLATES.

We ask the special attention of the trade to our C. H. No. 1 Boiler Plates, which we manufacture expressly for the Shells of Steam Boilers and stamp 50,000 pounds T. S. when desired. One hundred and sixteen tests of this iron, made during the last three years by the U. S. Inspectors of Steam Vessels, show an average tensile strength of 88,808 pounds to the sectional square inch, and an average reduction of area of the fractured section of 30 1/2 per centum. Our prices are as low as the production of a good article will admit of.



**VARIETY IRON WORKS.**  
**ALFRED C. REX & CO.,**  
Manufacturers of  
**Hardware Specialties,**  
IRON TOYS AND NOVELTIES,  
Main Office and Factory, Frankford, Phila.  
Phila. Sample Office, 415 Commerce St. New York Branch Office, 126 Chambers St.  
Send for Catalogue. **BRAMHALL & SPIER, Managers.**

**GEO. M. SCOTT,**  
**Bellows Manufacturer,**  
Johnson Street,  
Cor. 23d St.,  
CHICAGO, ILL.



Correspondence with First-Class Hardware Houses and Supply Agencies solicited.  
**RIEHLÉ BROS. STANDARD SCALES AND TESTING MACHINES**  
PHILADELPHIA, 50 South Fourth St. NEW YORK, 115 Liberty Street.  
Tests of Materials made daily at the Works, and certificates furnished. Reports copied and kept confidential.



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N. Y. Boring & Packing Co.		dis 50
<b>Push Parers.</b>		
Patent	✓ doz 15	dis 15
Diamond State	✓ doz 15	dis 15
<b>Pencils.</b>		
Faber's "Centers"	high list	dis 50
Faber's Round Gift	✓ gro 45.35 net	
Dixon's Lead	✓ gro 44.50 net	
Dixon's Lumber	✓ gro 44.50 net	
Dixon's Lumber	dis 40.10	
<b>Picks.</b>		
Railroad, 5 to 6, \$12.00; 6 to 7, \$13.	dis 50.10	
Adze Eye, 5 to 6, \$13.00; 6 to 7, \$13.	dis 53.10	
<b>Picture.</b>		
Brush, Wash, Sargent's list	dis 50.10	
Brush Head, T. & S. Mfg. Co.	dis 50	
Porcelain Head, Sargent's list	dis 50.10	
Porcelain Head, T. & S. Mfg. Co.	dis 33.10	
Niles' Patent	dis 33.10	
<b>Pinking Irons.</b>		
Planes and	✓ doz 75	net
Planes and Quality	dis 10	
Bench, Second Quality	dis 25	
Molding	dis 20.10	
The Stanley (S. R. & L. Co.)	dis 20.10	
Baldy's "Victor"	dis 23.10	
Plane Irons, Buck Bros.	dis 40.00	
Plane Irons, Auburn Tool Co.	dis 20.10	
Plane Irons, The Globe Mfg. Co.	dis 20.10	
L. & I. J. White	dis 30	
Plane Irons, Sandusky Tool Co.	dis 20.10	
<b>Pliers and Nippers.</b>		
Button's Patent	dis 33.10	
Hall's Pat.	dis 33.10	
Hammer, 2 1/2, No. 7 1/2, \$1.00 ✓ doz	dis 20.10	
Hammann & Beckley Mfg. Co.	dis 30.10	
Gale Pliers	dis 40	
Russell's Parallel	dis 25	
P. S. & W. Cant Steel	dis 40.00	
Day's Incinometers	add 63	dis 10
<b>Plumbs and Levels.</b>		
Stanley's	dis 45.10	
Stanley R. & L. Co.'s Pat. Adjustable	dis 63.10	
Stanley's Patent	dis 63.10	
Chapin's Non-Adjustable	dis 63.10	
Chapin's Patent Adjustable	dis 63.10	
Standard Rule Co.'s New Adjustable	dis 63.10	
Standard Rule Co.'s Non-Adjustable	dis 63.10	
Johnson's Patent Adjustable	dis 63.10	
Socket Level	dis 63.10	
Day's Incinometers	dis 20	
<b>Post Hole and Tree Augers.</b>		
Samson Post Hole Digger	✓ doz \$30.00, dis 20.10	
Fletcher's Post Hole Auger	✓ doz \$30.00, dis 20	
Leed's Auger	✓ doz \$30.00, dis 20	
Vaughan's Hole Auger	✓ doz \$30.00, dis 20	
Kohler's Little Giant	✓ doz \$27 net	
<b>Pruning Hooks and Shears.</b>		
Diston's Combined Pruning Hook and Saw	✓ doz 10.00, dis 10.10	
Diston's Pruning Hook	✓ doz 12.00, dis 10.10	
R. E. Lee & Co.'s Pruner	✓ doz 10.00, dis 10.10	
Henry's Pruning Shears	✓ doz \$3.50 to \$5.75 net	
Wheeler, M. & Co.'s Combination	✓ doz 15, dis 10	
Pruning Hooks and Cutters	✓ doz 40	
<b>Pulleys.</b>		
Hot House and Tackle	dis 63.10	
Japanese Screw	dis 63.10	
Japanese Side	dis 63.10	
Japanese Clothes Line	dis 63.10	
Hay Fork, "Anti Friction"	✓ doz 7.75, dis 10.10	
Hay Fork, "P" Common and Pat. Bushed	dis 20	
Hay Fork, Tuxford Pat. Iron	dis 45	
<b>Pumps, Cistern.</b>		
Pitcher Spout	dis 50	
Yard and Mill Length	dis 50	
Pressure	dis 50	
Saddles or Drive	✓ doz \$2.00, 2.25, 2.50, dis 55	
Bumby & Call Co.'s Cast Steel Valve	dis 50.10	
Spring, Leach's Patent	✓ doz \$7.00, dis 55	
Spring, Leach's Patent	dis 40	
Small Timbers	✓ doz \$1.44, dis 10.10	
<b>Rail.</b>		
Sliding Door, Wrought Brass	✓ doz 35.10, dis 20	
Sliding Door, Iron	✓ doz 12, dis 35	
Sliding Door, Painted	✓ foot 44, dis 30.10	
R. B. D. Co., Light	dis 10	
R. B. D. Co., Heavy	dis 10	
For 100 feet	Small, Med. Large, net	
Terry's Wrought Iron	✓ foot	dis 10
<b>Rakes.</b>		
Cast Steel	dis 50	
Malibu	dis 40	
<b>Razors.</b>		
J. R. Torrey Razor Co.	dis 20	
Wostenholme & Butcher	\$10 to 2, dis 10	
<b>Razor Straps.</b>		
Gemmer's Patent	dis 45.50	
Badger's (not Emerson)	dis 35.10	
Imitation Emerson	✓ doz \$2.00, dis 20	
<b>Refrigerators.</b>		
C. N. Pierce & Co.	dis 30 to \$34.50	
Challenge	dis 30	
Chicago Beer Coolers	dis 30	
<b>Rivets.</b>		
Black Iron and Tinned	dis 40	
Iron in bulk	dis 40	
Tinned Iron Rivets and Burrs	dis 40	
Copper Rivets and Burrs	dis 50	
No. 4	dis 10	
No. 5	dis 10	
No. 6	dis 10	
No. 7	dis 10	
No. 8	dis 10	
No. 9	dis 10	
No. 10	dis 10	

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# POST'S

## Waterproof Belt Oil and Leather Preservative,

### FOR WET AND DRY LEATHER BELTING.



Registered in the U. S. and Great Britain.

## The Standard Belt Oil of the World.

Leather dressed with this oil will not crack or rot, as heat, cold, water or gas has no effect on it. It will spread one-third further and last much longer than any oil for the same purpose. It never turns rancid; will keep in any climate. Belts may be run in water at one end and a hot room at the other, and still be soft, dry and pliable. Warranted not to start glue-laps or gum on belts or pulley, and to keep the surface perfectly smooth.

**Beware of Imitations Sold at a  
Cheaper Price, the Color of which  
is well Calculated to Deceive.**

In their Treatise on Machine Belting,  
**J. B. HOYT & CO.** speak of Post's  
Oil as follows:

### OILING OF BELTS.

"Care should be taken that belts are kept soft and pliable. For this purpose we decidedly advise the use of "**POST'S WATERPROOF BELT OIL AND LEATHER PRESERVATIVE.**" When applied as directed, it makes the belt smooth, pliable and adhesive, and causes it to hug the pulley closely, so that no power is lost from lack of pulley contact. It possesses excellent preservative qualities and also renders the leather more impervious to dampness than any article or preparation we know of.

Moisture must not be allowed to penetrate the laps or joints, as it will dissolve the cement and cause the laps to come apart."

### ESTABLISHED AGENCIES.

UNITED STATES:

J. B. Hoyt & Co., New York.  
J. & H. Phillips, Pittsburgh, Pa.  
J. B. Farnum, Woonsocket, R. I.  
G. D. Barr, Buffalo, N. Y.  
Preston & Nott, Minneapolis, Minn.  
Post & Co., Cincinnati, Ohio.  
J. B. Hoyt & Co., Chicago, Ill.  
Langlois & Son, Racine, Wis.  
Laurence & Herkner, New York.  
Barnum Bros., Troy, N. Y.  
Brown Bros. & Co., Providence, R. I.  
Jas. H. Billington & Co., Philadelphia, Pa.  
Beck & Gregg Hardware Co., Atlanta, Ga.  
Covel & Osborn, Fall River, Mass.  
J. Ashton & Son, Trenton, N. J.  
Geo. A. Smith, Richmond, Va.  
W. H. Dillingham & Co., Louisville, Ky.  
E. B. Preston & Co., Chicago, Ill.  
Cameron & Barkley, Charleston, S. C.  
Towner, Landstreet & Co., Baltimore, Md.  
C. E. James, Chattanooga, Tenn.  
C. B. Choate, East Saginaw, Mich.  
E. G. Studley & Co., Grand Rapids, Mich.  
Mantle & Cowan, Louisville, Ky.  
E. F. Bradford & Co., Cincinnati, Ohio.  
The J. LeRoy Pine Co., Troy, N. Y.  
H. D. Edwards & Co., Detroit, Mich.  
Morley Bros., East Saginaw, Mich.  
J. H. & N. A. Williams, Utica, N. Y.  
McGowan Bros., San Francisco, Cal.

CANADA:  
Robin & Sadler, Montreal.

NEW BRUNSWICK:  
R. Chestnut & Sons, Frederickton.

SCOTLAND:  
Robert Balderston, Glasgow.

ENGLAND:  
O. & W. Ormerod, Rochdale.

*If you cannot get POST'S OIL  
from your Belt Maker, send direct to  
us and we will see that you do  
get it.*

PRICE, PER GALLON, \$1.50

*We solicit Correspondence from  
Dealers in Manufacturers' Sup-  
plies.*

## E. L. POST & CO.,

No. 10 Peck Slip, New York,

SOLE MANUFACTURERS.



# WHOLESALE METAL PRICES, August 6, 1884.

## METALS.

**IRON.**—Duty: Bars, 8-10¢ to 11-10¢ per lb.; provided that no Bar Iron shall pay a less rate of duty than 35¢. Sheet, 1-10¢ to 1-10¢ per lb. Band, Hoop and Scroll, 1¢ to 1-10¢ per lb. Railroad Bars weighing more than 25 lb per yard, 7-10¢ to 1¢ per lb.

**American Iron.**  
Foundry No. 1..... per ton \$30.00 @ 30.00  
Foundry No. 2..... per ton 18.50 @ 19.00  
Gray Forge..... per ton 17.50 @ 18.00

**Scotch Iron.**  
Carnbroe..... per ton 20.50 @ 21.50  
Coltness..... per ton 21.50 @ 22.00  
Shotts..... per ton 21.50 @ 22.00  
Glenarack..... per ton 20.50 @ 21.50  
Langloan..... per ton 21.00 @ 22.00  
Summerlee..... per ton 20.75 @ 21.00  
Dalmellington..... per ton 19.25 @ 20.00  
Eglington..... per ton 19.25 @ 20.00  
Glyde..... per ton 19.50 @ 20.50

**Rails.**  
Steel, at Eastern mills..... per ton 38.00 @ 39.00  
Old Rails, Ts..... per ton 18.50 @ 19.00

**Scrap.**  
Wrought, per ton, from yard..... 30.00 @ 21.00

**Bar Iron from Store.**

Common Iron:  
¾ to 1 in. round and square..... per lb 2 @ 2.10¢

Refined Iron:  
¾ to 1 in. round and square..... per lb 2 @ 2.10¢

1 to 6 in. round and square..... per lb 2 @ 2.10¢

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1 to 6 in. round and square..... per lb 2 @ 2.10¢

**LEAD.**—Duty: Pig, 2¢ per 100 lb.; Old Lead, 2¢ per 100 lb.  
American..... 4½¢ @ 4½¢  
Bar..... 4½¢ @ 4½¢  
Pipe..... 4½¢ @ 4½¢  
Block Tin Pipe..... 19¢ @ 20¢  
Sheet..... 6½¢ @ 6½¢  
Shot..... Drop, 6¢; Buck, 7¢  
Chilled Shot..... 7¢

**ANTHONY.**  
Hallett's..... 11½¢ @ 11½¢  
Cookson..... 11½¢ @ 11½¢

**SPELTER.**—Duty: Pigs, Bars and Plates, \$1.50 per 100 lbs.

American, cash..... 4½¢ @ 4½¢  
Double Refined..... 4½¢ @ 4½¢

**ZINC.**—Duty: Pig or Block, \$1.50 per 100 lbs.

Sheet, 2½¢ per lb.  
60 lb. cask..... 5½¢ @ 5½¢  
Zinc—Ore..... 6¼¢ @ 6¼¢  
Zinc Tubing..... 10¢ @ 20¢

**Zinc Tubing.**—Dis. 2¢.

Plain..... 27¢  
Fancy..... 27¢  
Scotch and Extra Patterns..... 27¢

**BAHITT METAL.**  
N. P. U..... 7½¢ @ 7½¢  
A. 2¢; B. 2½¢; C. 14¢.

**WIRE.**  
Iron Wire.—Put up in 60 lb. bundles.

Nos. 00 to 9, 10, 11, 12, 13, 14, 15, 16, 17, 18.

Bright Market Wire..... 53¢ @ 53¢  
Charcoal..... 47½¢ @ 47½¢  
Bale Wire, Nos. 7 to 12..... 50¢ @ 50¢  
Annealed Market Wire..... 50¢ @ 50¢  
Fence Wire, Nos. 8 and 9..... 50¢ @ 50¢  
Grape Wire, Nos. 10 to 14..... 50¢ @ 50¢  
Bessemer Steel Wire..... 57½¢ @ 60¢  
Coppered Market Wire..... 50¢ @ 50¢  
Bale Wire, Nos. 7 to 12..... 50¢ @ 50¢  
Galvanized Market Wire..... 50¢ @ 50¢  
Fence Wire..... 50¢ @ 50¢

**Stone or Weaving Wire.**  
Nos. 16 to 18..... 21¢ @ 21¢  
Nos. 19 to 21..... 21¢ @ 21¢  
Nos. 22 to 24..... 21¢ @ 21¢  
Nos. 25 to 27..... 21¢ @ 21¢  
Nos. 28 to 30..... 21¢ @ 21¢  
Nos. 31 to 33..... 21¢ @ 21¢  
Nos. 34 to 36..... 21¢ @ 21¢  
Nos. 37 to 39..... 21¢ @ 21¢  
Nos. 40 to 42..... 21¢ @ 21¢  
Nos. 43 to 45..... 21¢ @ 21¢  
Nos. 46 to 48..... 21¢ @ 21¢  
Nos. 49 to 51..... 21¢ @ 21¢  
Nos. 52 to 54..... 21¢ @ 21¢  
Nos. 55 to 57..... 21¢ @ 21¢  
Nos. 58 to 60..... 21¢ @ 21¢  
Nos. 61 to 63..... 21¢ @ 21¢  
Nos. 64 to 66..... 21¢ @ 21¢  
Nos. 67 to 69..... 21¢ @ 21¢  
Nos. 70 to 72..... 21¢ @ 21¢  
Nos. 73 to 75..... 21¢ @ 21¢  
Nos. 76 to 78..... 21¢ @ 21¢  
Nos. 79 to 81..... 21¢ @ 21¢  
Nos. 82 to 84..... 21¢ @ 21¢  
Nos. 85 to 87..... 21¢ @ 21¢  
Nos. 88 to 90..... 21¢ @ 21¢  
Nos. 91 to 93..... 21¢ @ 21¢  
Nos. 94 to 96..... 21¢ @ 21¢  
Nos. 97 to 99..... 21¢ @ 21¢  
Nos. 100 to 102..... 21¢ @ 21¢  
Nos. 103 to 105..... 21¢ @ 21¢  
Nos. 106 to 108..... 21¢ @ 21¢  
Nos. 109 to 111..... 21¢ @ 21¢  
Nos. 112 to 114..... 21¢ @ 21¢  
Nos. 115 to 117..... 21¢ @ 21¢  
Nos. 118 to 120..... 21¢ @ 21¢  
Nos. 121 to 123..... 21¢ @ 21¢  
Nos. 124 to 126..... 21¢ @ 21¢  
Nos. 127 to 129..... 21¢ @ 21¢  
Nos. 130 to 132..... 21¢ @ 21¢  
Nos. 133 to 135..... 21¢ @ 21¢  
Nos. 136 to 138..... 21¢ @ 21¢  
Nos. 139 to 141..... 21¢ @ 21¢  
Nos. 142 to 144..... 21¢ @ 21¢  
Nos. 145 to 147..... 21¢ @ 21¢  
Nos. 148 to 150..... 21¢ @ 21¢  
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Nos. 181 to 183..... 21¢ @ 21¢  
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Nos. 190 to 192..... 21¢ @ 21¢  
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Nos. 256 to 258..... 21¢ @ 21¢  
Nos. 259 to 261..... 21¢ @ 21¢  
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Nos. 292 to 294..... 21¢ @ 21¢  
Nos. 295 to 297..... 21¢ @ 21¢  
Nos. 298 to 300..... 21¢ @ 21¢  
Nos. 301 to 303..... 21¢ @ 21¢  
Nos. 304 to 306..... 21¢ @ 21¢  
Nos. 307 to 309..... 21¢ @ 21¢  
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## English Letter.

(From Our Regular Correspondent.)

LONDON, July 21, 1884.

## THE OUTLOOK

is very much the same as at the date of my last report. Business in general continues dull, and there is no decrease whatever in the competitive underselling to which I have so often alluded. All values are depressed, and for the most part inclined to even lower levels than those already reached. Profits are meager as a rule, and credit is subjected to such close scrutiny that it is virtually restricted. On the other hand, failures are few in number and not for large amounts, so that there is good reason for entertaining the hope that business is on a sound basis, and there is no suspicion whatever of inflation. It is true that present statistics as to failures are open to question, seeing that since the coming into operation, with this year, of the new Bankruptcy act there is believed to have been a remarkable increase in the number of what are termed "private arrangements." Under these arrangements a debtor, in order to avoid the publicity and severe examinations which would be inevitable were he to resort to the Bankruptcy Court, calls his creditors together privately and induces them to release him from his debts in consideration of a prompt payment of so much in the pound, rather than have the delays, risks and costs of the bankruptcy procedure. In many instances creditors prefer this summary way out of difficulties, and accept the compositions offered. One dissentient, however, may upset the whole scheme, and unless he can be bought off the failure must take place in the usual manner. The great mischief of these private arrangements is that they pass unrecorded, and the debtors so released from their liabilities may go on afresh without the world in general being any the wiser for their lapses. This is felt to be a serious drawback, and efforts are being made to induce the authorities to make the registration (at least) of such arrangements compulsory and prompt.

Some dissatisfaction and discussion have arisen here in consequence of the alleged discrepancies between the charges of the United States consuls in Great Britain and in France. It is said that in London and elsewhere in this country the charges of the American consuls are 15/-, being 10/6 for certification and invoices and 1/6 each for affidavits in triplicate, or an additional 1/6—10/6 in all—if the affidavits are quadruplicated. In Paris the total charge for certification of invoices and affidavits is 13 francs, or equal to about 10/6d. English manufacturers are asking, therefore, why they should be charged more for the privileges of your consuls than are French manufacturers or exporters for exactly the same services.

The annual show of the Royal Agricultural Society took place last week at Shrewsbury, with fine weather and large attendance, over 50,000 persons being present on each of the "shilling" days. The collection of machinery and implements was a good one, but the business done was not large. Many American implements—such as reapers, mowers, lawn mowers, forks, shovels, and so on—were shown, chiefly by such houses as Rollins, Lankester, Lloyd, Lawrence & Co., Churchill & Co., &c. Prizes were offered for ensilage machinery, but no award was made, as none of the competing articles reached the required standard. Trials will shortly be made of self-binding reapers, for which the Walter Wood, McCormick, Johnstone and other American machines will be to the fore, with good prospects of carrying off the prize.

The weather of the week has been good, on the whole, although heavy showers of rain have fallen in some parts of the country. The temperature has ruled tolerably high, however, so that the crops are coming forward rapidly, and harvest bids fair to be general in the course of from two or three weeks henceforward. In the course of a run through the agricultural counties of Essex, Cambridgeshire and Lincolnshire, a few days ago, I noticed several lots of oats cut, and much more nearly ready for being reaped. Some of the crops are heavy and "laid," but in the course of conversations with farmers I gathered that they are very well satisfied with harvest prospects, which they consider are better, on the whole, than at any time these seven or eight years.

## THE METAL MARKET

has been quiet during the week, but there appear to be a fair number of transactions as the result of negotiations inaugurated at the quarterly meetings. These transactions have been in respect of raw materials and pig iron for the most part, the buyers of finished iron being indisposed to speculate or to anticipate legitimate requirements to any appreciable extent. The meetings of last week were productive of very little new business, indeed, at the time, and, on the whole, may be counted as being among the dullest of such gatherings for some years past. Generally speaking, the outlook at the moment is considered only moderately good, although harvest prospects are promising. Should the crops be reaped in good condition, a certain amount of money would doubtless be circulated, but it will need more than one good harvest to restore British agriculture to even a moderately prosperous condition. At Glasgow the market has been without other than nominal movements, a quiet tone pervading warrants, which closed on Thursday at 41/3½ ton. Scotch makers' brands are unchanged and in poor request. Connal's stocks are still being depleted, and now compare well with the statistics for the corresponding date of last year. At Middlesboro' there is nothing new to report, values being nominally unaltered on the basis of 36/9 @ 37/- for No. 3, with other numbers as of late. The shipments are below the average of the season, and the local consumption is still decreasing. On the West Coast hematite pigs remain very sluggish at 44/- @ 46/- for mixed numbers in usual proportions, with an output which is considerably in excess of the wants of consumers. In the other smelting districts crude iron is dull and irregular, with over-supply in most localities.

Heavy manufactured iron is in fair demand as regards other than shipbuilding sorts, but there is no activity in any quarter. Fencing wire is dull and weak. The same remark applies to galvanized iron, in which competition is so severe that a new attempt is being made to effect an organization which shall put a stop to underselling. Ordinary finished iron is quiet and irregular, the business doing being chiefly in medium and common sorts of bars, sheets and hoops, quotations for which I gave last week. Few of the mills are making anything like full time, and many of them are indifferently engaged. Welsh bars are cabled £4. 17/6 @ £5 for ordinary India assortments. Old D. H. rails are very dull at 55/- @ 57/6, f.o.b. London, and 52/6 @ 53/6, f.o.b. exports, with light stocks. For heavy wrought scrap the nominal quotation is about 44/- ton, according to J. H. Austin & Co., and for cast scrap 40/- @ 41/-, f.o.b. Old boiler tubes, say Messrs. F. Pitts & Co., range from 52/6 to 55/- ton. Steel is without particular features to note, quietude being the characteristic of almost all branches of the trade. Old railway leaf-spring steel is called 61/- @ 62/- ton, net cash, c.i.f. New York, but is not in request. Bessemer bars are £8 @ £8. 10/-; hoops, £8 @ £8. 15/-; sheets and plates, £9. 10/- @ £10. 10/- ton.

Steel rails are unchanged at my recent quotations, but new orders are very scarce. In tin plates there is no movement of importance, but prices are firm. Messrs. Caine & Laybourn, Liverpool, say: "The Birmingham meeting was not marked by any special feature; only a moderate business was transacted. Cokes, in quantity, for forward delivery, were not to be obtained except at a slight advance on recent figures. Cokes here for prompt delivery are readily bought up at 15/- @ 15/3. Steels of the various descriptions are in fair demand, but charcoals at present are somewhat neglected. Stocks continue to decrease, and, as makers are in most cases believed to be fairly booked ahead, prices are not likely to remain at the present level, especially as the autumn months usually show more briskness in the trade." They quote, all less 3% for cash, as under:

Crown extra best charcoal.....	19/- @ 19/6
Best charcoal (best soft steel, good charcoal coating).....	18/- @ 18/6
Best steel, good coke finish.....	18/6 @ 17/-
28 " common.....	15/6 @ 16/-
Derwent grade coke.....	15/6 @ 16/-
Common coke.....	15/3 @ 15/6
" " L.C.W. 14x10.....	14/3 @ 14/6
" " " 14x30.....	14/3 @ 14/6
" " C.W.W. 14x30.....	13/- @ 13/6
Terne Plates.	
Charcoal.....	14x30.....18/3 @ 18/9
" " L.C.W. 28x30.....	37/- @ 37/6

## SCOTCH FIG IRON

has varied very little indeed on the week, the margins on warrants having been most meager, and therefore disappointing to speculators. The members of the Glasgow "ring" are reported to be heartily disgusted with the continued inanimation of the market, but, like Micawber, they are confident that something will turn up before long. Meantime, the public hold aloof and will not come to the rescue of the ring, who are now the principal holders of warrants—much to the chagrin of most of them. There are now 115 furnaces in blast in Scotland, as compared with 96 this date last year, the output being thereby lessened to the extent of 3600 or 2800 tons weekly. In Connal's Glasgow stores there are now 588,066 tons (a reduction of 325 tons last week), as against 585,171 tons this date in 1883. The shipments to date are 33,447 tons in arrears, while the pig-iron importations from Middlesboro' to Scotland have decreased by 4315 tons.

## MIDDLESBORO' FIG IRON

is sluggish and nominal at about 36/9 @ 37/- for No. 3 and G.M.B., f.o.b. at makers' wharves in Tees, less 2½, 10th of following month, as under:

No. 1 Foundry.....	40/6	Mottled.....	35/-
" " " ".....	39/0	White.....	34/6
" " " ".....	37/0	Refined metal.....	32/6
" " " ".....	36/0	Kentledge.....	30/0
" 4 Forge.....	35/6	Cinder.....	28/6

Shipments are behindhand, and the local consumption is constantly lessening.

WEST COAST HEMATITE PIGS are in poor request all round, with 44/- @ 46/- asked for mixed lots in usual proportions. Makers' brands are:

Cleator.....	No. 1.....	No. 2.....	No. 3.....
Lonedale.....	47/0	47/6	47/6
Workington.....	45/-	44/6	44/-
West Cumberland.....	45/-	44/6	44/-
Lowther.....	45/6	45/-	44/6
Distington.....	45/6	45/-	44/6
Harrington.....	47/6	46/-	45/-
Solway.....	45/-	44/6	44/-
Maryport.....	46/-	45/6	45/-

Last week's shipments included 10,445 tons pig iron and 2315 tons steel rails.

## COPPER REPORT.

I am favored with the following by Messrs. Harrington, Horan & Co., of Liverpool: "Since the issue of our last report prices of Chili bars have fluctuated up to £55. 10/- and down to £53. 17/6 ton, the market to-day being steady at \$54. 5/- spot, and £54. 10/- three months' prompt, good ordinary brands. Import of Chili copper during the past fortnight, 1506 tons fine, against 960 tons fine same time last year; delivery, 1618 tons, against 943; import of other copper during the past fortnight, 1877 tons fine, against 2270; delivery, 835 tons, against 1326. The total imports of Chili and other copper into Liverpool and Swansea since January 1 have been 38,972 tons; deliveries during the same period, 42,417 tons fine; for same time last year the figures were 33,705 and 29,989 tons respectively."

The fifth annual meeting of the United States Association of Charcoal Iron Workers will be held at St. Louis, Mo., from September 30 to October 4. To give ample time for papers and discussions, five or six business sessions will be held, and the social features are expected to include three excursions—one to the charcoal furnaces and kilns, specular and soft red hematite iron ore deposits and timber lands of Central Missouri; one to the noted specular ore deposits of Pilot Knob and Iron Mountain, and the lead mines of Southeast Missouri, and one by boat on the Mississippi River, visiting the crystal plate-glass works, lead and silver smelting works, and the iron and

steel industries of St. Louis and vicinity. The local committee propose that visiting members shall be at no expense, except their hotel bills, after arriving in St. Louis, and contemplate closing the meeting by a complimentary banquet.

## HARDWARE NOVELTIES.

## Michelson Patent Trunk Caster.

The Michelson Manufacturing Company, Limited, of 66 Wisconsin street, Milwaukee, Wis., are the manufacturers and sole owners of the Michelson "None Such" Patent Trunk Caster. A perspective view of the caster is shown in Fig. 1. The caster, when applied to a trunk, is sunk in the bottom strip, so as to leave the roller projecting, after which the plates of the corner iron are fastened to the trunk in the usual manner. Referring to Fig. 2, we see the caster with the top plate removed, showing the arrangement by which a rotation in two mutually perpendicular planes is accomplished. The caster consists of a well, A, made of cast iron, in the center of which, and of one



Michelson Patent Trunk Caster.—Fig. 1.—Perspective View.

piece with it, is cast the perforated shank A', the hole in the center being made to receive the bolt or nut that secures the removable face-plate to the caster. The central shank is turned down to such a diameter as to make an easy-working bearing for the arm B. The shank is not reduced to the same diameter for its entire length, but is left with a shoulder at the bottom that serves as a bearing for and also keeps the arm B from scraping on the bottom of the well A when rotating. The arm B is cast with a slot in it for the roller C, and at the sides are cast two slight depressions which serve as bearings for the spindle on which C runs. The hole in B, for receiving the shank A', is milled out, thus giving a more accurate fit, besides a smoother bearing surface. C is a roller of cast iron which rotates on a loose spindle made of a piece of iron or steel wire cut to the required length. Referring again to Fig. 1, we see that the face-plate has a slot in it through which projects the roller C. The face-plate,

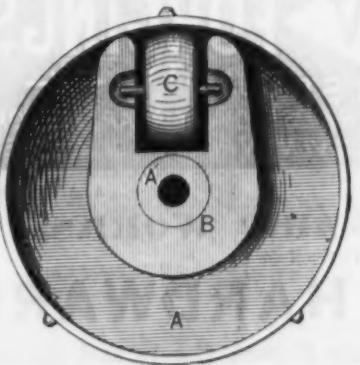


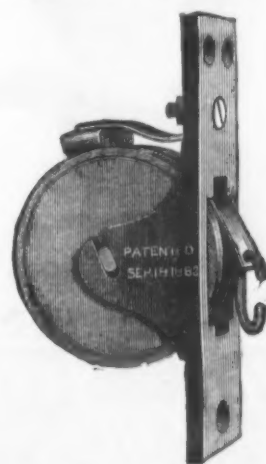
Fig. 2.—View with Surface Plate Reversed.

which is made of malleable iron, has two lugs on the inside, one on each side of the slot receiving the roller, and these lugs, bearing against the arm B, prevent the face-plate from pressing against the roller C, and thus interfering with its free revolution. The arm B is raised very slightly above the sides of the roll, thus affording a bearing on which the face-plate may rest and revolve without striking the sides of the well A. It is in this manner that the double rotation is accomplished, the roller C rotating in a vertical, and the arm B in a horizontal, plane. The Michelson Manufacturing Company are at present able to turn out 1000 sets of these trunk casters per day. They are also preparing to put on the market, in about two months, a large line of furniture casters made on the same principle, but of a variety of artistic and attractive designs.

## The Shumard Sash Balance.

Those of our readers who have inquired for spring sash balances in the past will no doubt be interested in the device illustrated in the engravings herewith. It is known as the Shumard Sash Balance, and is manufactured by the Shumard Sash Balance Company, No. 114 North East street, Richmond, Ind. The manufacturers offer this device as a perfect and practical balance for all kinds of sash. Among the advantages which they enumerate for it are the following: That it does away with the use of box frames, weights and ropes; that it is simple in construction and easy of attachment in both old and new houses; that it is noiseless in operation and can be placed behind the sash and at one side if desired, so as to do away with the openings which are required in the old rope system. The construction of the balance is such that the same pair of balances can be arranged to several different lengths and weights of sash. Still another advantage which will be appreciated by housewives who are in the habit of removing sashes from the windows in house-cleaning time is that the sashes can be readily detached, since they are fastened to the balance simply by the hook shown in the engraving. Several different sizes are manufactured, adapted to sash weighing from 8 to 22 pounds, and having a length from 32 to 40 inches.

Special sizes are made to order. The capacity of these sash balances is capable of being increased or diminished within certain limits. This is done by passing the ribbon once more around the drum to increase its power, or letting it off a round or more to diminish its power. Small adjustments are made by means of the spring brake which is shown above the drum in the engraving. By increasing the tension of this brake, which is



The Shumard Sash Balance.

readily done by means of a screw, and which can be accomplished after the balance is in place in the window frame, variations of 1 pound or more are readily made.

## The Columbia Swing Spring.

The Pope Manufacturing Company, of Boston, Mass., have brought out a new bicycle seat spring, represented in accompanying cut, and known as the Columbia Swing Spring, which they describe as the combination of three different inventors toward the solution of the difficult problem in bicycle seat springs. The jar incident to all riding is either vertical, lateral or fore and aft, or a combination of two of these. The wheel itself and its freedom of motion relieves sufficiently the lateral jar, it has been found; and lateral yield in the spring, to any considerable extent, gives an unsteadiness of the seat which has condemned for most riders several otherwise good springs. The ordinary bolted clip spring is, where well made, sufficient relief from the vertical jar. But the fore-and-aft jarring caused by meeting obstructions to the large wheel, and the constant vibration of the small wheel, has, it is said, hitherto found on efficient relief except with springs otherwise objectionable. This last difficulty the Columbia swing spring is designed to overcome by means of two pendent links combined with other parts in a peculiar way, as shown in the cut, so as to allow a fore-and-aft motion of the seat to a limited but sufficient extent to stop vibration, and to ease the rider over considerable obstructions. As a safety device for averting headers, it is claimed to be of



The Columbia Swing Spring.

great value. This spring is only applicable to the "Expert" Columbia bicycle, and on that machine is readily interchangeable with the one usually sold with it heretofore.

## Payson's Door-Jamb Bolt.

The Payson Manufacturing Company, of 1319 to 1325 West Jackson street, Chicago, are offering to the trade a new form of Door-Jamb Bolt, the accompanying cuts of which show the way it is applied to a door, and also

its manner of working. Referring to Fig. 1, the cut represents a door locked with the Payson door-jamb bolt. The bolt is let in the edge of the casing with the screw-plate flush with the door frame, the casing for the movable part of the bolt projecting somewhat beyond the plane of the door. The striking-plate, which is simply a rectangular

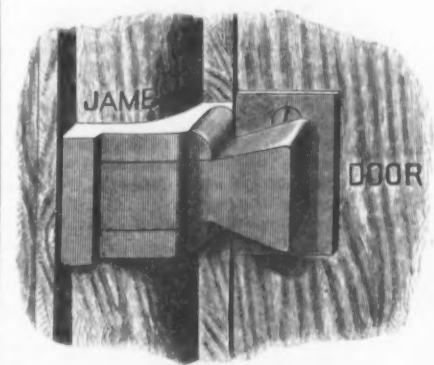


Fig. 1.—Payson's Door-Jamb Bolt Applied.

piece of metal, is secured to the face of the door at the place where the bolt catches, thus protecting the door from injury. From Fig. 2 some idea may be gathered of the construction and manner of operating the bolt. The bolt consists of a frame box made in two pieces and united together. At one end is a screw-plate for fastening it to the door, while the other end is slotted to receive the bolt piece, which is pivoted through the center, as shown in the cut. Fastened to the bolt piece is a spiral spring which at every quarter revolution draws it into the slot until it rests in recesses at the back or bottom of the slot, in which position it is impossible to rotate it. In unfastening the bolt, as shown by the slotted lines in Fig. 2, the bolt piece is first pulled directly out for a short distance and given a quarter revolution, when on releasing it the spiral spring draws it down into its seat. The bolts are made of bronze and bronzed iron. Information as

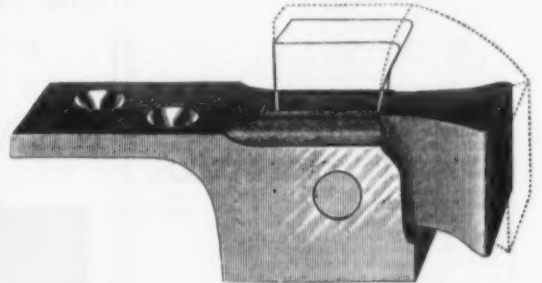


Fig. 2.—Payson's Door-Jamb Bolt, Method of Operation.

to prices and styles is given in Trade Report, H. J. Brainerd, No. 125 Chambers street, New York, is agent in this city.

An Associated Press telegram from Allentown, Pa., dated July 31, says: "The Lehigh Valley Portland Cement Company, a corporation of the State of New York, some years ago became the owner of the lease from Aaron and Ephraim Troxell upon their farm in Whitehall Township, near this city. Buildings, machinery and a factory were erected at a cost of \$45,000. Some time ago the New York banks declined further discounts, and called in outstanding loans. This and some litigation in the City of New York has made the company short in cash. A number of foreign attachments were issued in the Common Pleas of Lehigh County for material and machinery, aggregating \$6000. To-day a confessed judgment to one of the company for \$33,000 was also added. Prior to all these liens is a mortgage for \$150,000."

This week has been prolific of big gas "strikes" in Western Pennsylvania. On the 4th inst., at Pittsburgh, the well on the property of Park, Bro. & Co., struck a heavy flow of gas at a depth of 1075 feet. On the 5th the Penn Tunnel Company made a strike at Homewood, within the city limits of Pittsburgh, which is said to equal the celebrated Westinghouse gas well. On the same day what is said to be the largest gas well in Westmoreland County was struck on Daum's Farm, 3 miles from Irwin Station.

**THE HAMILTON PATENT**  
Wrought-Iron Slide  
**DOOR HANGERS,**  
FOR WOOD TRACK.  
Center Flange, Double Tread. Durable & Cheap.  
3 SIZES, 4, 5 AND 6 INCHES.

Also manufacturers of the U. S., Flange, Check Back, Western, Rider Wooster and Champion Anti-Friction Hangers, Rail-Stay Rollers, Clothes Reels, &c.

**SEND FOR PRICE LIST.**  
**MEDINA MFG. CO.,**  
SAMPSON & SWETT, Proprietors,  
MEDINA, - NEW YORK.

**THE GREATEST**  
**ROCK BREAKER**  
ON EARTH  
CAPACITY 1 TON A MINUTE  
**GATES IRON WORKS**  
50-52 S CANAL ST. CHICAGO.

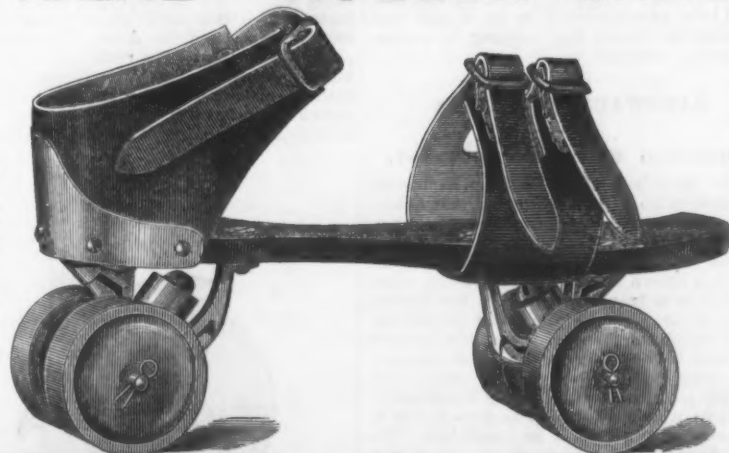
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## "IDEAL" ROLLER SKATE.



SISE, GIBSON &amp; CO., - New York.

**YEOMANS & EADON,**  
HIGHBRIDGE FORD  
SHEFFIELD, (England)  
MAKERS OF  
SPECIALLY  
HAMMERED SQUARE  
DOUBLE SHEAR STEEL  
FOR  
TRIP HAMMER CUTLERY.  
OUR MAKE OF SHEAR STEEL IS SPECIALLY ADAPTED  
TO MEET THE REQUIREMENTS OF CUTLERY MANUFACTURERS.

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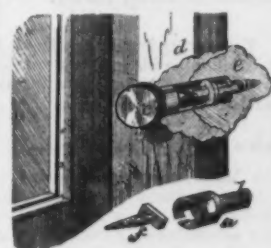
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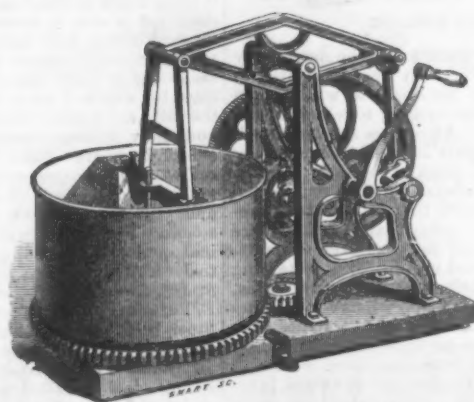
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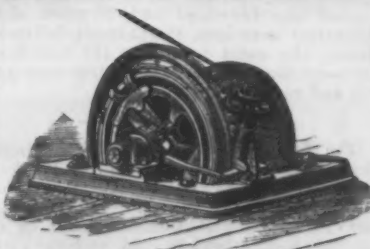
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Fig. 2 shows the manner of filing the short or inside edge of the end tooth.

Fig. 3 shows the section of the file in the gullet of the saw.

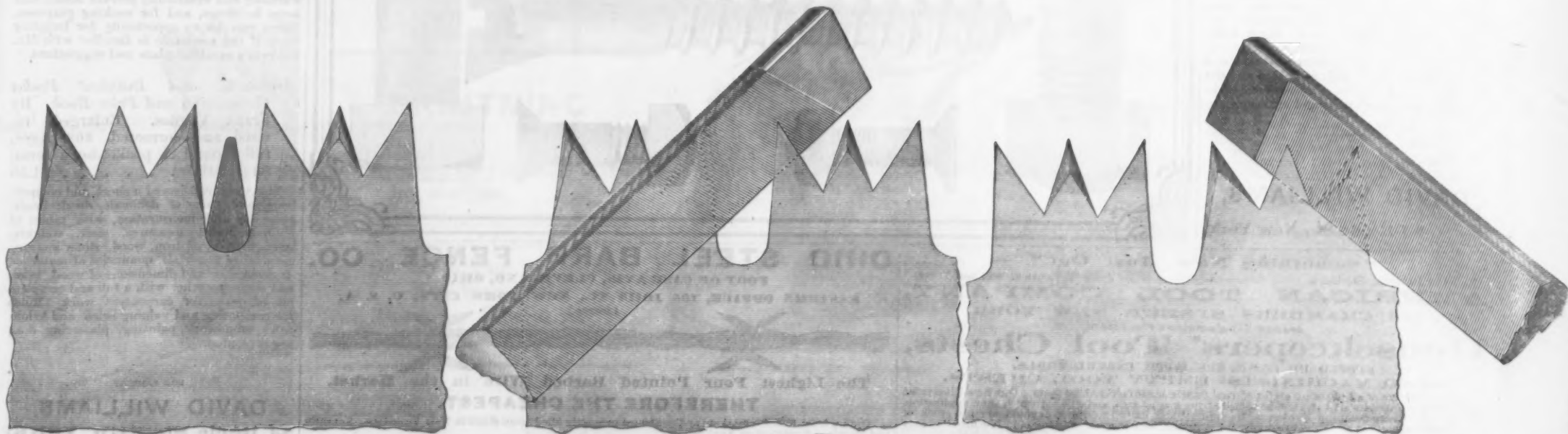
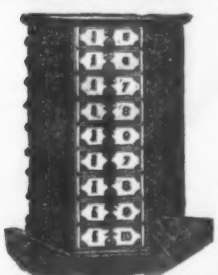


Fig. 3.

Fig. 1.

Fig. 2.



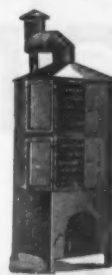


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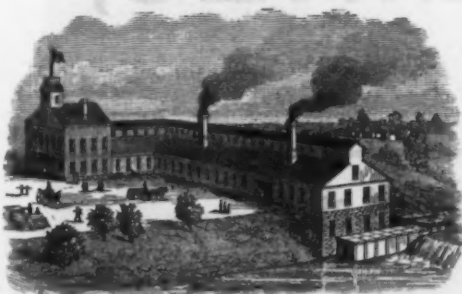
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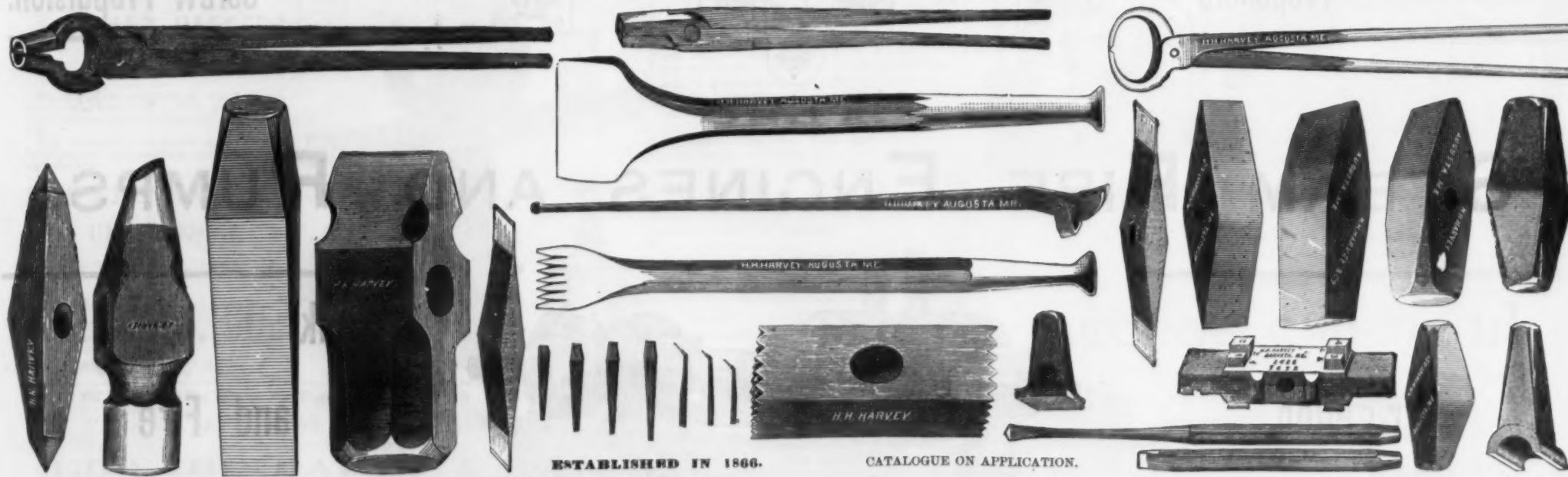
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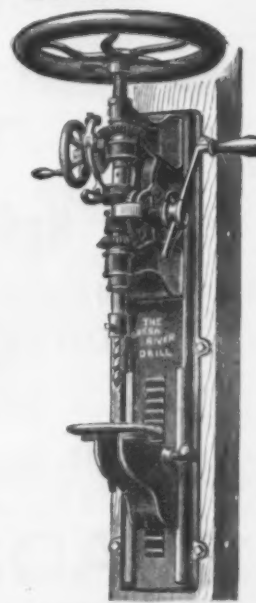
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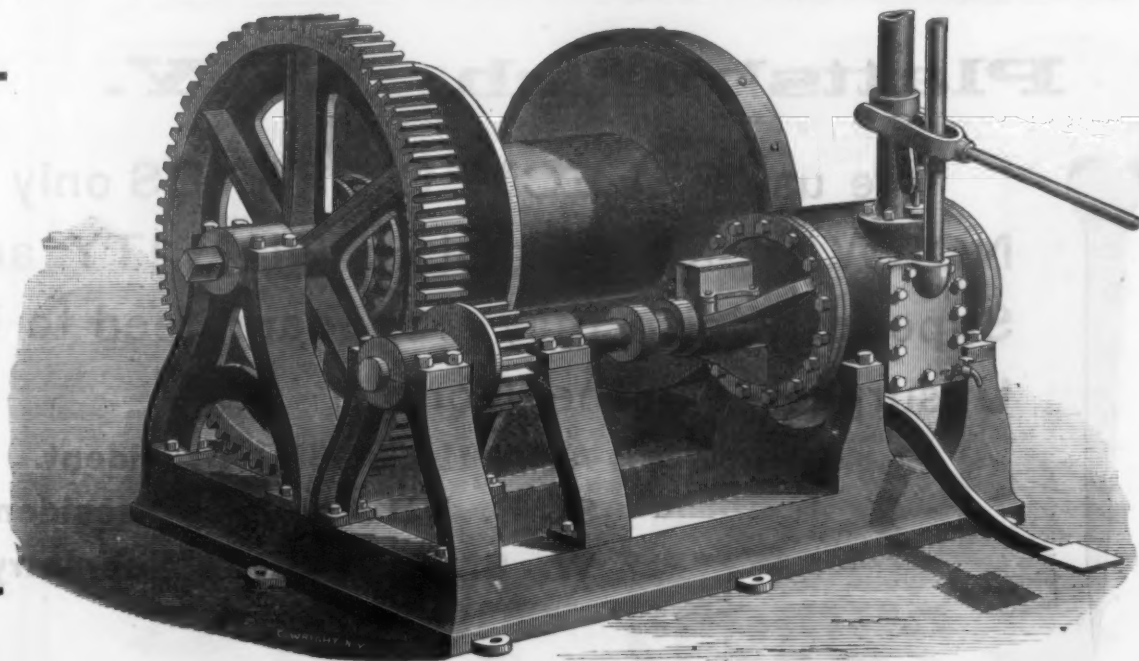


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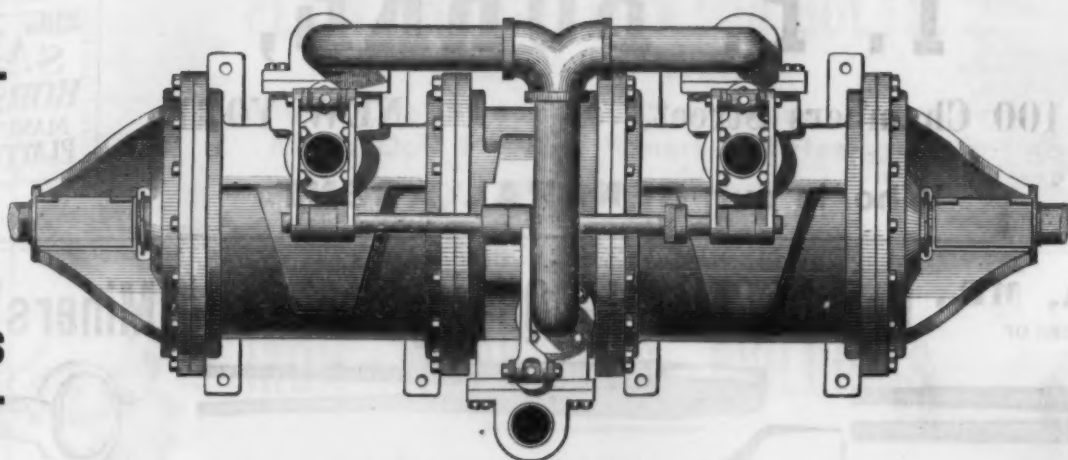
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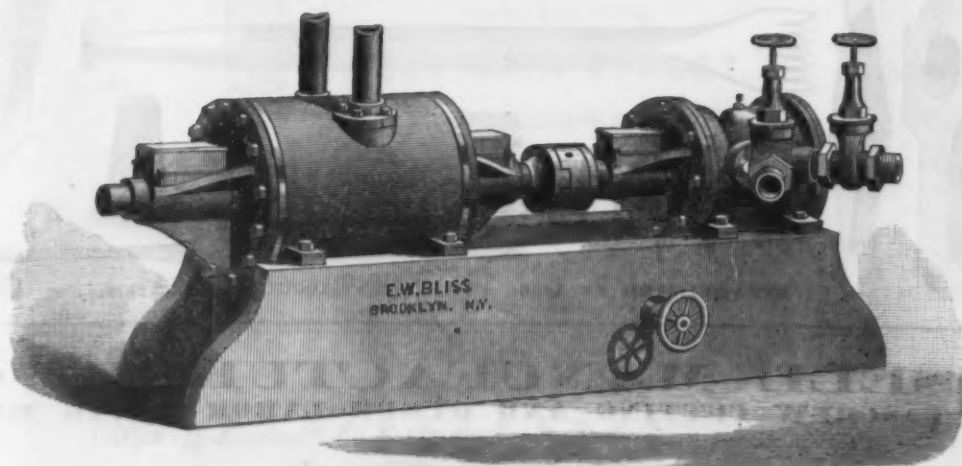


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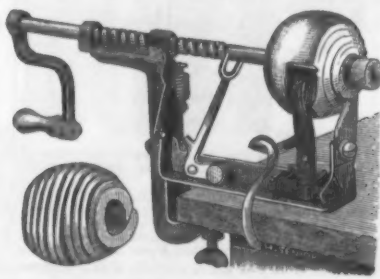
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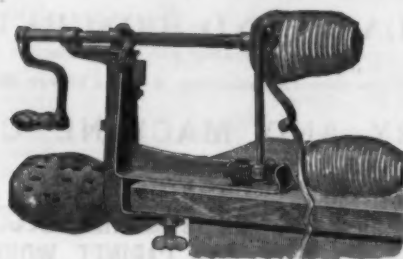


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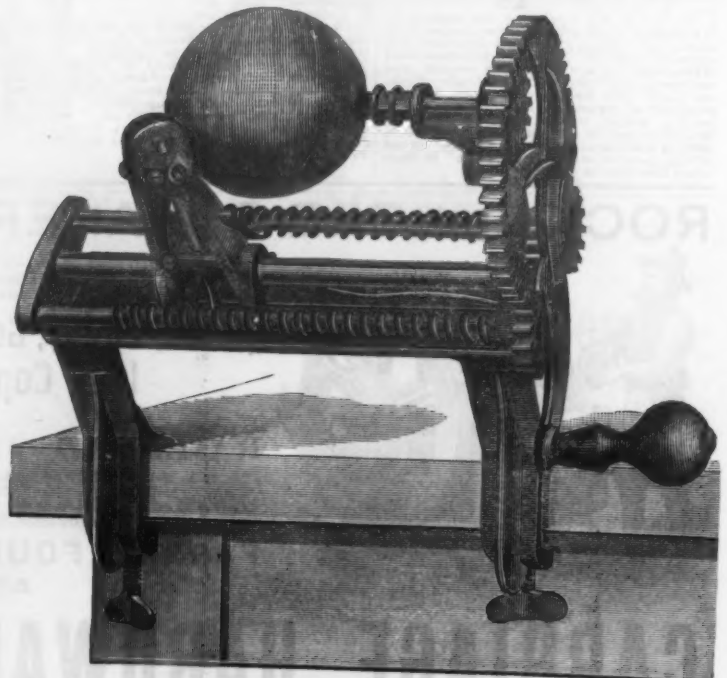
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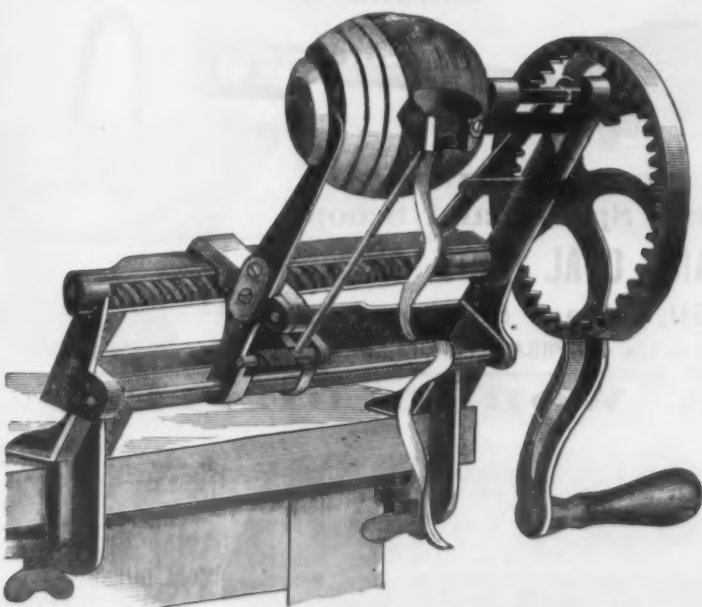
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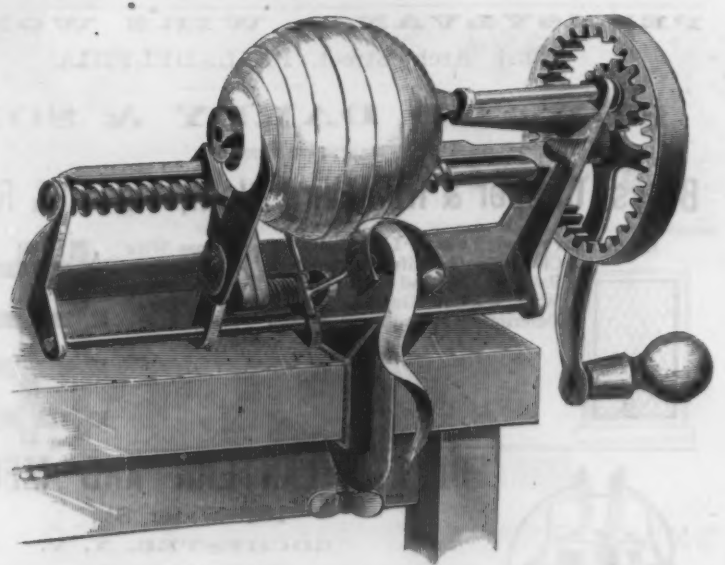
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**Adams.—Notes in Mechanical Engineering.** By Henry Adams. 93 pages, 8vo, cloth, 1884, (London). \$1

The author of this book, a teacher of Mechanical Engineering in the city of London College, has rendered a service to students and others by issuing this note book. The notes are compiled from various sources and contain a large amount of formulae, definitions and valuable matter in brief form upon the principles of mechanics and the properties of materials; tools and their uses; general machinery; the different classes of the steam engine; hydraulic machinery and the operations of the pattern maker, founder and blacksmith in connection with all mechanical work.

**Armstrong.—Chimneys for Furnaces, Fireplaces and Steam Boilers.** By R. Armstrong, C. E. 76 pages, 18mo, boards; 1873. . . \$0.50

The writer in this little book confines his remarks to such elementary facts, principles and rules as are likely to be useful to those practical engineers and others whose engagements and undertakings do not admit of much study or scientific research.

**Armstrong.—Construction and Management of Steam Boilers.** By R. Armstrong, C. E., with an appendix by Robert Mallet, C. E.; 8th edition, illustrated, 184 pages, 12mo, cloth; 1878. . . \$0.75

The principles and rules are given for the proper proportions and lengths of boilers; also practical instructions for setting up. There are examples of the strength and durability of boilers, and a chapter on the causes of explosions.

**Ball.—Applied Mechanics.** By Prof. R. S. Ball; 66 illustrations, 143 pages, 12mo, cloth. . . \$1

This little volume is intended for those who, having some knowledge of elementary mathematics and mechanics, desire to gain information as to the practice of mechanical principles. The mechanical powers and their special applications, tools and their uses, including the lathe, steam-hammer, &c., are thoroughly considered.

**Holler.—Practical Treatise on the Construction of Iron Highway Bridges.** By A. P. Holler, C. E.; 2d edition, with many illustrations, 144 pages, 8vo, cloth, . . . \$2.50

To town officers and those not informed on mechanical details this work presents rules for bridge lettings, forms of specifications, and a clear statement in plain language of how to select and test materials, and to construct iron highway bridges. There are also practical remarks upon the applications of the principles of the lever to a ready solution of strains upon beams and trusses.

**Du Bois.—Theory of the Steam Engine.** Translated by Prof. A. J. Du Bois, from the 4th edition of Weisbach's Mechanics; 500 illustrations, 559 pages, 8vo, cloth; 1878. . . \$5

Treats of the theory and principles of heat and steam, and contains practical examples of stationary, marine and locomotive engines, with additions by R. H. Bull, C. E., showing American practice.

**Edwards.—Practical Steam Engineer's Guide.** By Emory Edwards, M. E.; 119 illustrations, 420 pages, 12mo, cloth; 1882. . . \$2.50

Beginning with a review of the non-condensing steam engine, the author, in simple language, explains the design, construction and management of American stationary, portable and steam fire engines. The book is not in the least theoretical, and steam users in general will find this a useful guide for practical work.

**Forney.—Catechism of the Locomotive.** By M. N. Forney, M. E.; with 19 plates and 227 illustrations, 609 pages, 12mo, cloth; 1882. . . \$2.50

The principles, construction and operation of the locomotive engine of the present day are comprehensively described, with the least possible employment of scientific or technical terms. Locomotive engineers, firemen and railway employees will find in this book a full account of modern American practice in locomotive construction, and the latest scientific discoveries concerning it.

**Hamilton.—Useful Information for Railway Men.** By W. G. Hamilton; 8th edition, revised, 577 pages, pocket form, morocco, gilt; 1880. . . \$2

A valuable compilation of practical information on every question that can possibly arise concerning railroads and their working. Useful to locomotive engineers, firemen, trainmen and all other railway employees.

**Martin.—Screw Cutting Tables.** By W. A. Martin; 16 pages, 8vo, cloth; 1874. . . \$0.40

These tables show the proper arrangement of wheels for cutting the threads of screws of any required pitch, with a table for making the universal gas-pipe thread and taps.

**Maw.—Recent Practice in Marine Engineering.** By William H. Maw. 12 numbers, complete, 2 volumes (1 text, 1 plate). With over 150 folio plates, large quarto, cloth, . . . \$15

This work gives an illustrated account of the leading types of marine engines constructed during the past ten years in this country and Europe. The engines illustrated are in most cases reprinted from *Engineering*. They are given in great detail, and embrace all classes, from the heaviest engines for ocean steamers and ships of war to those used in steam yachts and launches. The plates are fine examples of the engraver's art, and, together with the accompanying reading matter, present the latest practice of the best engineering firms. Besides marine engines, the work includes descriptions and illustrations of other machinery, such as steam dredges, hoisting machines, engines for cable-towing, &c. Many novelties of construction are presented, and engineers cannot fail to be interested and benefited by careful examination of these suggestive studies and elaborate details.

**Perry.—Practical Mechanics.** By John Perry, M. E.; 148 illustrations, 271 pages, 12mo, cloth. London. . . \$1.50

This book is a well-arranged explanation of the principles of mechanics, and to understand and comprehend its contents requires no more scientific knowledge than any intelligent mechanic should have. The work is designed for the use of those who are not trained mathematical students. The author is clear and concise in his statements and illustrations, and the whole subject is treated in a satisfactory manner.

**Rose.—Complete Practical Machinist.** By Joshua Rose; 8th edition, revised and enlarged, 190 illus., 441 pages, 12mo, cloth. . . \$2.50

This is a handbook of lathe and vise work, with descriptions of the various tools and processes employed. It embraces drills and drilling, hardening and tempering, taps and dies, together with instructions for the making and using of tools. Attention is given to milling machines and tools, and directions for calculating the speed of wheels and pulleys are presented. Various kinds of pumps are described, and the slide-valve is treated, with directions for setting the same.

**Simpson.—Manual of Screw Cutting.** By Wm. Simpson. 2d edition, enlarged and improved. 24 pages, 16mo, cloth, 1883.

This little book gives rules for calculating the change gear on screw-cutting lathes, to cut square and angular threads, per inch or per pitch, with two or four gears. Examples are given under each rule. Tables for United States Standard and Whitworth's (English) Screw and Gas Pipe Threads are given; also the standard sizes of bolts and nuts, and sizes of tapping holes. The author is a practical machinist and has explained his subject clearly.

## IRON, STEEL AND METALLURGY.

**Bloxam.—Metals; Their Properties and Treatment.** By Prof. C. L. Bloxam; 105 illustrations, 312 pages, 12mo, cloth; 1872. . . \$1.50

With an absence of technicalities, the author distinguishes the properties of the useful metals and their mechanical preparation in such a practical manner that the chemical principles involved may be clearly understood.

**Bauerman.—Metallurgy of Iron.** By H. Bauerman; 5th edition, revised and enlarged, 58 illustrations, 515 pages, 12mo, cloth. . . \$2

This work treats of the physical properties of iron ores, and the most approved means of reducing them to the purposes of the manufacturer. The methods of assay and analyses of iron ores are practically considered, as also their composition and distribution. The subject of blast furnaces, their capacity and production, has also received careful attention. In the present edition the author has added to the chapter on Steel Making, and has explained and illustrated the progress recently made in the process of steel manufacture, both of Siemens and Bessemer, especially the latter, by the adoption of lime as a dephosphorizing agent. The book also contains a chapter on the mechanical properties and tests of Malleable Iron and Steel. The author has succeeded in his avowed attempt to supply much practical and reliable information for ironworkers and others, in condensed form.

**Greenwood.—Steel and Iron.** Comprising the practice and theory of the several methods pursued in their manufacture, and of their treatment in the rolling mill, the forge and the foundry. By W. H. Greenwood; 97 illustrations, 536 pages, 12mo, cloth. . . \$2

This work satisfactorily presents in convenient form the most important processes employed in the manufacture of iron and steel. The illustrations are in most cases reduced from actual working drawings. The style is simple and clear. Although many of the recent improvements in American practice have not received the thorough attention which they merit, the book treating more particularly of English practice, the author has succeeded in producing a comprehensive manual for the technical student, and an intelligent and valuable assistant to the practical iron-worker. The chapter headings are as follows:

Explanation of Terms; Refractory Materials, Crucibles, &c.; The Ores of Iron; Metallurgical Chemistry of Iron; Cast or Pig Iron; The Production of Pig Iron; The Blast Furnace; Hot-Blast Stoves, Hoists, Lifts, &c.; Fuel, Blast, Charges, Yield and Waste Gases of the Blast Furnace; Castings in Iron, Foundry Appliances, &c.; Malleable or Wrought Iron; The Production of Malleable Iron Direct from the Ore; Indirect Methods for the Production of Malleable Iron; The Production of Malleable Iron in Open-Hearth Furnaces; Refining of Pig Iron; Puddling; Mechanical Puddling and Rotary Puddling Furnaces; Forge and Mill Machinery, Furnaces, Plant, and Operations; Steel and Ingot Iron; The Methods Employed in the Production of Steel Direct from the Iron Ore and by the Carburization of Malleable or Bar Iron, by the Decarburization of Pig Iron in the Finery or in the Puddling Furnace, by the Fusion of Pig Iron with Malleable Iron or with Iron Ores in the Open-Hearth Steel-Melting Furnace; The Bessemer or Pneumatic Process for the Production of Steel from Pig Iron; The Basic Process for the Conversion of Phosphoric Pig Iron into Steel, in the Bessemer Converter; The Production of Homogeneous Steel Ingots, Fluid Compression of Steel, Compound Armor Plates, &c.

**Ehrner.—The Manufacture of Steel.** By M. L. Ehrner; 9 plates, 196 pages, 8vo, cloth; 1872. . . \$3.50

In this translation from the French, the author critically considers the nature of steel, the methods of refining pig iron, and describes the theory and manufacture of steel by cementation and the Bessemer process in all the countries of Europe. There is also an appendix by the translator, Lenox Smith, on the Bessemer process in the United States.

**Overman.—The Molder's and Founder's Pocket Guide.** By J. Overman, M. E.; new edition, with supplement on statutory and ornamental molding, ordnance, malleable iron castings, &c., by A. A. Fesquet; 44 illustrations, 342 pages, 12mo, cloth, 1880. . . \$2

The construction of molds for all kinds of metals and materials, and the processes of molding machinery, hollow-ware, bells, statues and articles used for ornamentation and in the industrial arts are thoroughly explained and illustrated. There are also practical details of the construction of melting furnaces, the melting and founding of metals, and the composition and nature of alloys. Useful tables and recipes for workers in metal are appended, together with remarks on the manufacture of Malleable iron castings.

**Overman.—Metallurgy.** By F. Overman, M. E.; 6th edition, 377 illustrations, 723 pages, 8vo, cloth; 1852. . . \$5

This treatise presents a practical view of the various operations of metallurgy, with details of working, ventilating and draining mines; assaying and testing minerals; descriptions of furnaces, forge hammers, rolling mills. The preparation of ores and the classification of metals are considered in detail.

**Overman.—The Manufacture of Steel.** By F. Overman, M. E.; new, enlarged and revised edition, by A. A. Fesquet; 285 pages, 12mo, cloth; 1873. . . \$1.50

Blacksmiths and manufacturers of articles of hardware will find in this book a concise account of the nature and varieties of steel, and the practice and principles of working and making steel after the approved German and English methods.

**West.—American Foundry Practice.** By Thomas D. West; illustrated, 391 pages, 8vo, cloth; 1882. . . \$2.50

A practical treatise on the management of cupolas and the melting of iron. The author, a practical foundryman, treats of the molder and his trade, green-sand molding; loam and dry-sand molding, and the manipulation of iron castings. The work is a valuable addition to the list of books upon this subject.

## HYDRAULICS.

**Bayles.—House Drainage and Water Service.** By James C. Bayles; 5th edition, 3 folding plates and 30 illustrations, 365 pages, 8vo, cloth. . . \$3

This work discusses the subject of house drainage and water service in cities, villages and rural neighborhoods in a manner instructive alike to architects, mechanics and house owners. The best forms of plumbing practice are described and illustrated, and the principles upon which good work depends explained. The book is of practical value to the building trades and all interested in the mechanics of hygiene. The contents are as follows: Hygiene in its practical relations to health. Sewer gas. Waste and soil pipes. Traps and seals and the ventilation of soil pipes. Water closets. Service pipes and water service in city houses. Tanks and cisterns. The chemistry of plumbing. Elementary hydraulics applicable to plumbing work. Sanitary construction and drainage of country houses. Water supply in country districts. Suggestions concerning the sanitary care of premises. The plumber and his work.

**Gerhard.—Hints on the Drainage and Sewerage of Dwellings.** By Wm. Paul Gerhard; 282 illus., 302 pages, 12mo, cloth. . . \$2.50

To all persons interested in healthy homes, whether they are planning new houses or altering old ones, this volume will commend itself. Books of this class should also be in the hands of every professional builder, and plumbers especially will find contained in these pages not only the practical information required for the details of their trade, but also much that they should know to make them competent in their work, and to prevent them from making the too frequent careless or stupid mistakes which result from bungling work. The book is divided into twelve chapters, the headings of which are as follows: Fresh Air versus Sewer Gas; Necessity of Ventilation in Rooms Containing Modern Conveniences; Defective Arrangement of Plumbing Fixtures; Soil and Waste Pipes as Usually Found in Dwellings; Traps and Systems of Trapping; Details of Traps; Insecurity of the Common Water-Seal Traps; Defects in the Plumbing Work of Dwellings; Cellar Drains and Drainage of Cellars; Usual Defects of House Drains; Sewer Connections, Privy Vaults and Cess-pools; System of Internal Sewerage as it should be in a Dwelling; Plumbing Fixtures; Removal and Disposal of Household Wastes. The chapter on Plumbing Fixtures is very complete, and the numerous illustrations add greatly to the value of the book.

**Du Bois.—Hydraulics and Hydraulic Motors.** Translated by Prof. A. J. DuBois, from the 4th edition of "Weisbach's Mechanics;" 380 illustrations, 675 pages, 8vo, cloth; 1878. . . \$5

This work consists of numerous practical examples for the calculation and construction of water-wheels, including breast, undershot, back-pitch and overshot wheels, as well as a special discussion of the various forms of turbines.

## DRAWING.

**Haupt.—Working Drawings—How to Make and Use Them.** By Lewis M. Haupt; 55 pages, 8vo, 9 folded plates. . . \$0.60

This little work fills the gap between the art of drawing as ordinarily taught in the schools and as required for use in the shop. Although designed as a text-book for use with classes, it is still well adapted for self-instruction. It is also highly scientific rather than elementary.

**Maxton.—Engineering Drawing.** By John Maxton; 3d edition, revised, 7 plates and 350 illus., 280 pages, 12mo, cloth. London (Weale's series). . . \$1.40

This book in a small compass covers much the same ground as many larger works. The examples, though drawn on a smaller scale, are beautiful specimens of what good drawings should be. The chapter on drawing from models and large machinery is a useful one, and it enables the author to naturally connect in it many of the more difficult problems in machine drawing and show their practical applications. Tools are described, directions given for "inking-in," and the theory of outline drawing elaborated rather more than is usual.

**Rose.—Mechanical Drawing Self-Taught.** By Joshua Rose; 330 engravings, 313 pages, 8vo, cloth; 1883. . . \$4

This work will be found to be thoroughly adapted to the practice of American machinists. It comprises instructions in the selection and preparation of drawing instruments, with elementary instruction in practical mechanical drawing. The illustrations give examples in simple geometry and elementary mechanism, including screw-threads, gear wheels, mechanical motions, engines and boilers.

## MISCELLANEOUS.

**Blinn.—A Practical Workshop Companion for Tin, Sheet-Iron and Copper-Plate Workers.** By Leroy J. Blinn; with over 100 illustrations, 184 pages, 12mo, cloth; . . . \$2.50

Although this work has been nearly 20 years before the public and has never been revised, it has run through many editions and is still deservedly popular. It contains rules for describing the various kinds of patterns used by metal workers, and treats of practical geometry, mensuration of surfaces and solids, capacities of bodies and effects produced by water and heat, tables of the weights of metals, of areas and circumferences, and numerous practical recipes useful to the mechanic are included in the work.

**How to Keep a Store.** By S. H. Terry; 406 pages, 5 by 7½ inches, cloth. . . \$1.50

This book should be in the hands of every one interested in the selling of goods at retail. Among the subjects discussed are: The selection of a business; choice of a locality; buying a stock of goods; examining, marking and arranging goods; how to advertise; employment of clerks; selling for cash and credit; keeping accounts; expenses; copartnerships; losses by fire, theft, &c.; influences of social life on business; buying at auction; investment of profits; insolvency; business qualifications. Every branch of the retail trade is treated upon in a direct, business-like manner. It is a thoroughly practical book for merchants and clerks.

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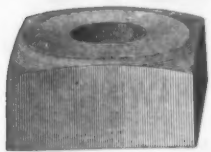
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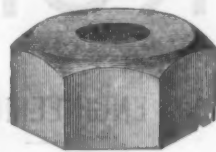
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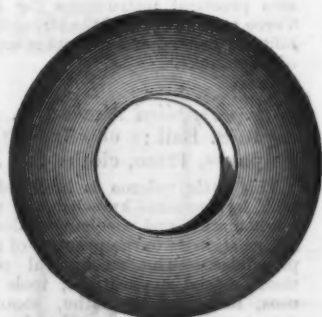
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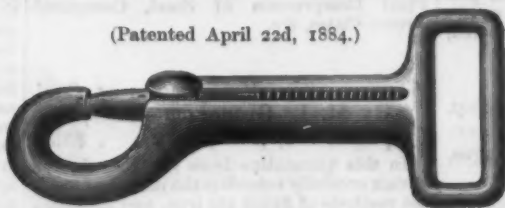


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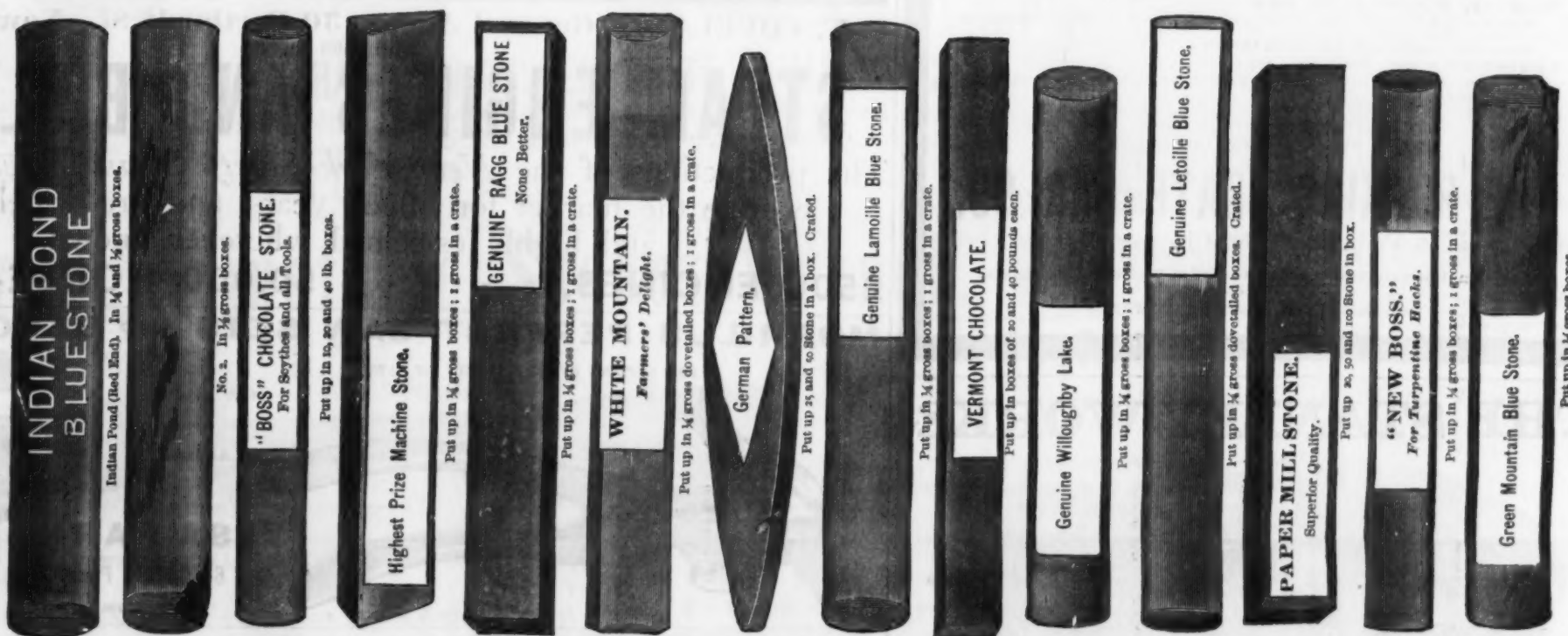
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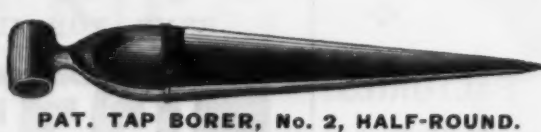
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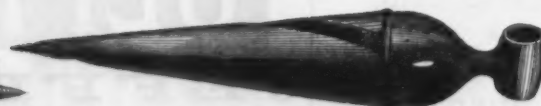


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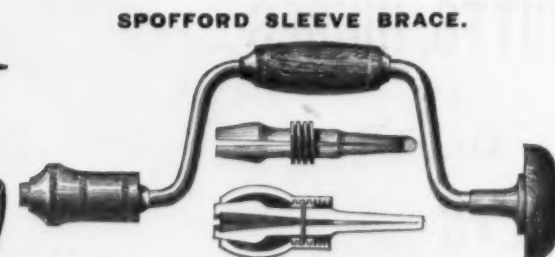
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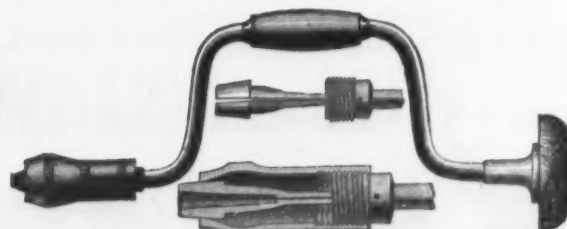
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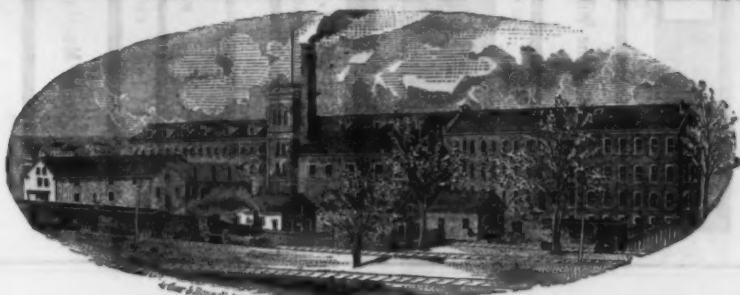
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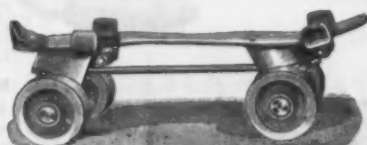
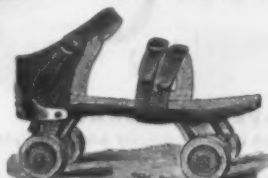
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Rink, Clamp, Half-Clamp and Sidewalk Skates.

OUR CLAMP SKATES DEFY COMPARISON. THESE SKATES ARE IN USE  
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There are but two secrets of our success: 1st. We make absolutely the best Skate. 2d. We uphold the dignity of dealers. We are very particular in referring inquiries to our agents within their respective territories.

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Pattern Making,  
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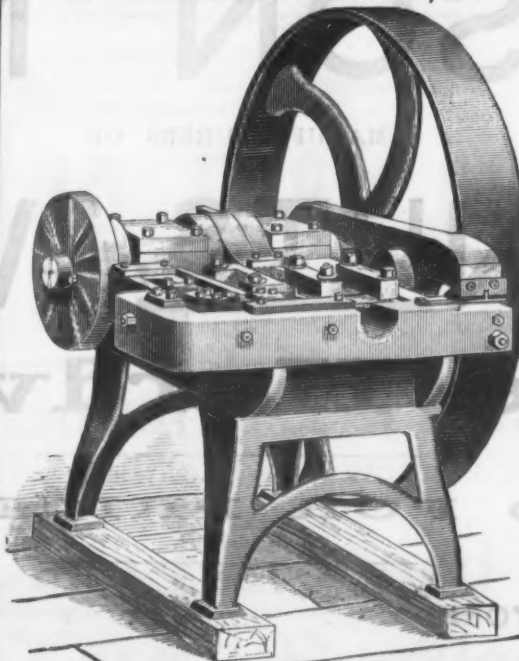
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IN BOTTLES AND IN CANS. READY FOR USE.  
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SOLD EVERYWHERE. ON ITS MERITS TO BE  
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THE best Railroads, Bridge Works, Car Shops and Agricultural Works in this country claim this machine has no equal. For rapidity and quality of work, ease of adjustment, quick changing of dies, variety of work it is capable of performing, it surpasses all other make of Headers. The machine is simple in construction, not liable to get out of order, and is long-lived. There are but few working parts, and all easy of access. The large range of work that can be done on these machines specially recommend them to railroad, car shop, ship and bridge building establishments. Upsetting truss rods and punching eye-bolts are some of the special features of these machines. Rivets, square or hexagon head bolts, plow, patch, key, T and carriage bolts are some of the many kinds of work the machines are adapted for. Our No. 1 is used very largely in carriage-bolt and agricultural works, it being a very fine tool for making blank upsets for carriage bolts, as well as the very best carriage-bolt header in the country. Nos. 2 and 3 are also used for making car coupling pins and many kinds of odd forgings heretofore done by hand. For a practical bolt-heading, rivet-making and upsetting machine we defy competition and guarantee satisfaction.

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and Solutions.

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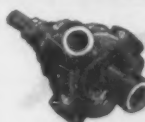
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Lock and support upper and lower  
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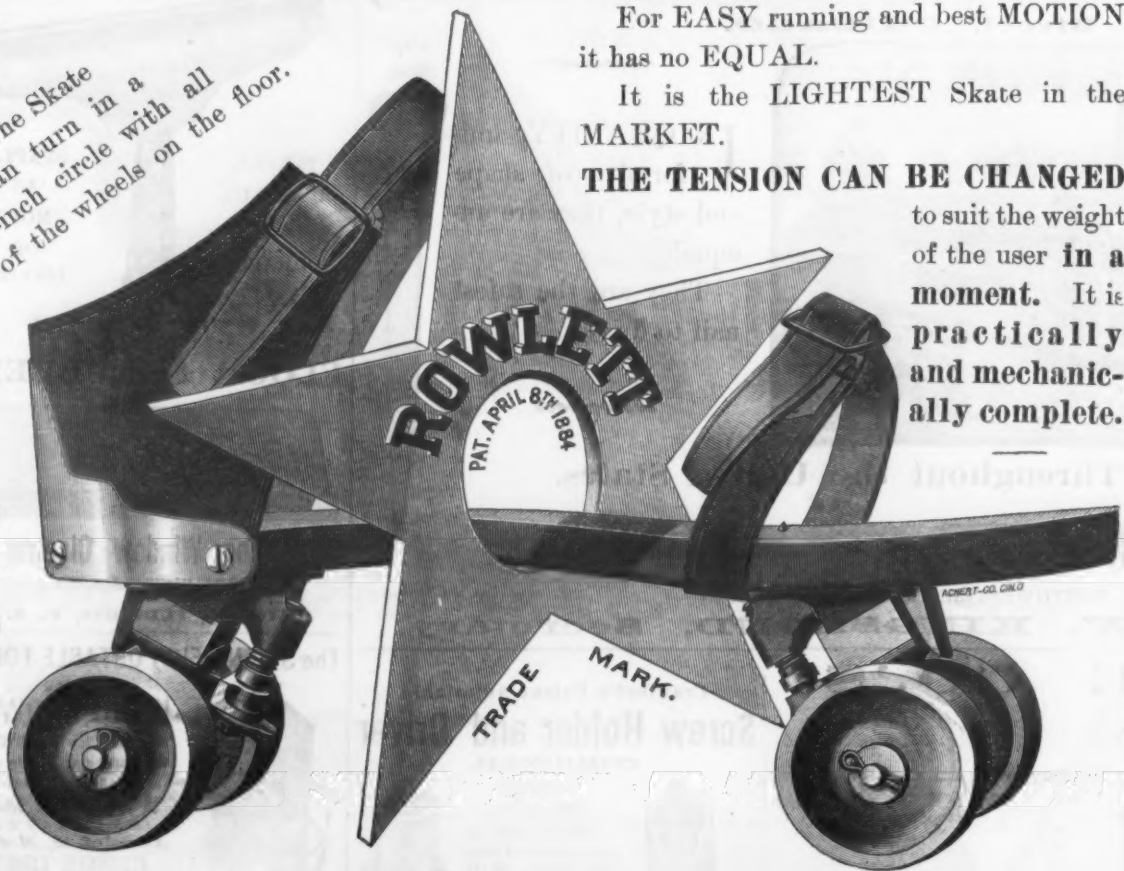
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## Patent Adjustable Socket Wrench.



FOR THE FOLLOWING PURPOSES IT HAS NO EQUAL, VIZ.:

For putting up Shafting or any overhead work where a Wrench is required. Holding on to the Bolt Head while the Nut is being removed. Removing Nuts from Carriage Axles or any place where it is an advantage to grasp the Nut or Bolt Head securely.

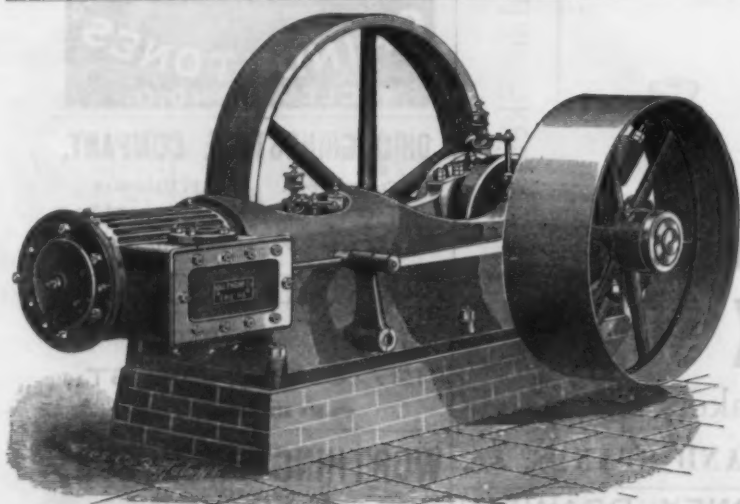
This Wrench is not only adapted to any sized Nut, but will grasp and hold it in the Socket-Jaws when it is removed from the axle of the carriage, and preserve it clean from dirt and grit while oiling the axle. The nut may again be applied to the axle without removing it from the socket, thereby obviating the soiling of the hands by handling the nut.

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Premiums AWARDED FOR EXCELLENCE!  
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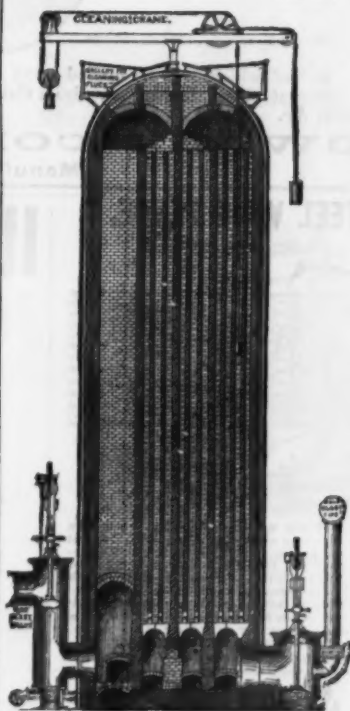
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"Was the only cutlery sent to the jury with the request that they submit it to the most severe tests - Nails were whittled and wire cut with these knives, a test which the English and other makers declined to submit their goods to."



Prize Medal Exhibit, Paris Exposition 1878  
From Photographs. Show Case 12 feet wide 9 feet high.

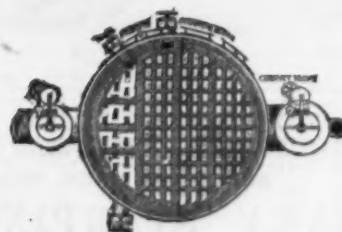
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Whitwell Fire-Brick  
**HOT-BLAST STOVES**

Contract for erecting the same. Also, for Building and Replacing all types of Blast Furnaces. Combining Economy with Efficiency and Modern Improvements, wherein the output of Furnaces is increased fully 50 per cent. and the fuel consumption decreased in the same ratio.

My Blast Engines, Hoisting Engines, &c., have no superior in strength of parts, duty or economy. I solicit an opportunity to make proposals on Blast Furnaces, Rolling Mill or Steel Works Machinery.



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Single or Double Swing.



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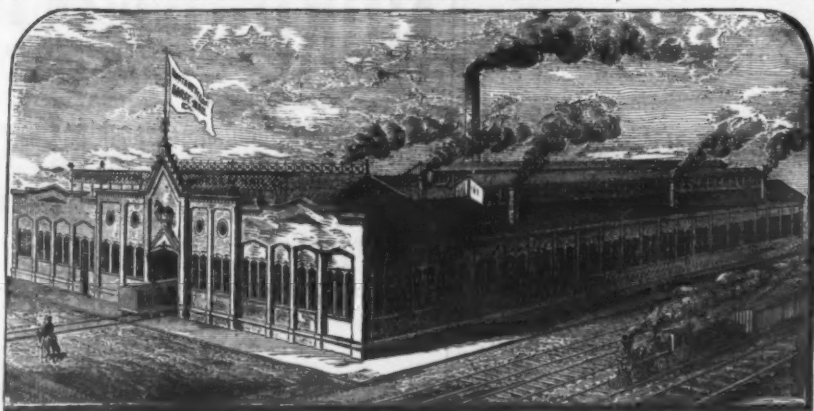


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OUR NAILS are manufactured from the finest brand of Swedish Iron, of which we use the entire product.



IN QUALITY, uniformity of shape and style, they are unequaled.

They are the safest nail to drive.

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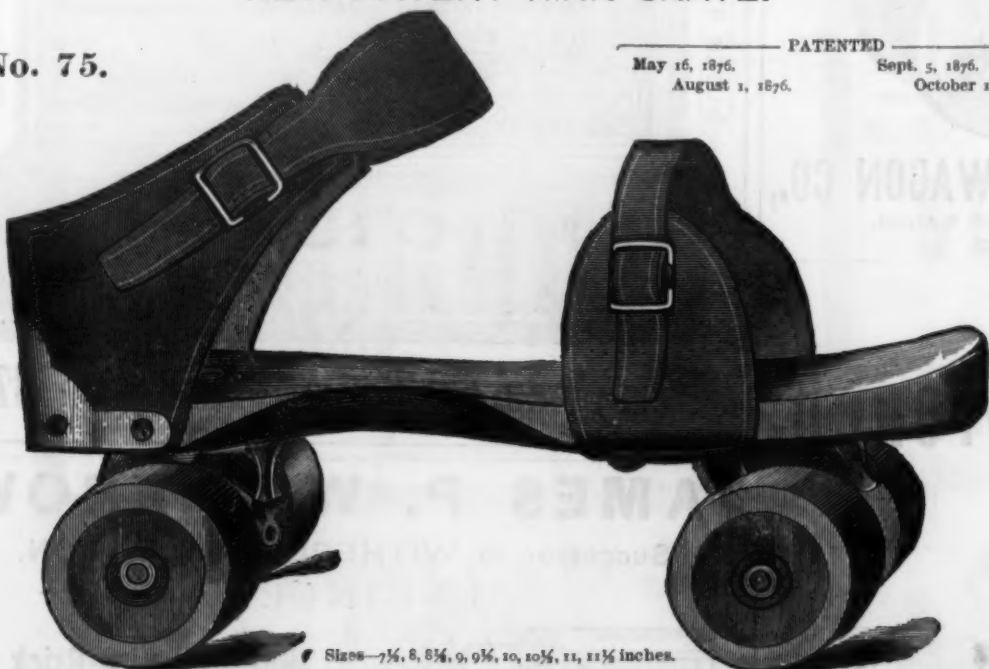
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No. 75.

PATENTED  
May 16, 1876. August 1, 1876. Sept. 5, 1876. October 10, 1876.

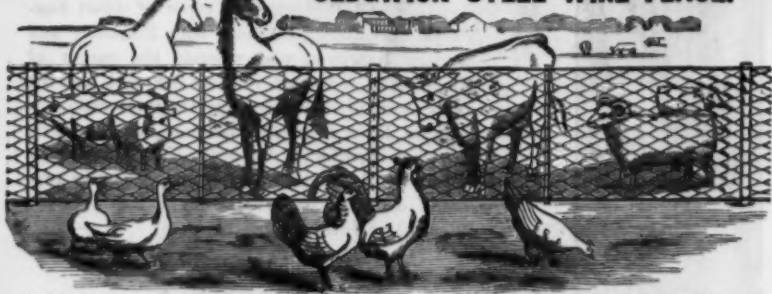


Sizes—7½, 8, 8½, 9, 9½, 10, 10½, 11, 11½ inches.

We have just issued three Catalogues of our goods, any of which will be mailed upon application—one Catalogue illustrating six styles of Roller Skates; another illustrating thirty different styles IceSkates; also a Catalogue giving illustrations of a full line of Gun Implements, Wood Goods, Dog Collars, Curry Combs, &c.

UNION HARDWARE COMPANY,  
75 Chambers Street, NEW YORK. Manufactory, TORRINGTON, CONN.

### SEDGWICK STEEL WIRE FENCE.

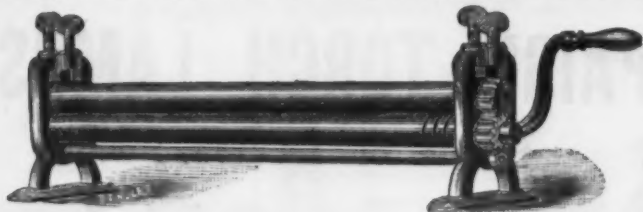


Is the only general purpose Wire Fence in use, being a Strong Net-Work without Barbs. It will turn dogs, pigs, sheep and poultry, as well as the most vicious stock, without injury to either fence or stock. It is just the fence for farms, gardens, stock ranges and railroads, and very neat for lawns, parks, school lots and cemeteries. Covered with rust-proof paint (or galvanized) it will last a life-time. It is Superior to Boards or Barbed Wire in every respect. We ask for it a fair trial, knowing it will wear itself into favor. The Sedgwick fences, made of wrought iron pipe and steel wire, defy all competition in resistance, strength and durability. We also make the best and cheapest All Iron Automatic or Self-Opening Gate, also Cheapest and Neatest all Iron Fence, Best Wire Stretcher and Post Auger. Also Manufacture Russell's excellent Wind Engines for pumping water, or geared engines for grinding and other light work. For prices and particulars ask hardware dealers, or address, mentioning paper, SEDGWICK BROS. Mfrs., Richmond, Indiana.

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Protects the Pistol from Perspiration.  
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Permits Instant Withdrawal.  
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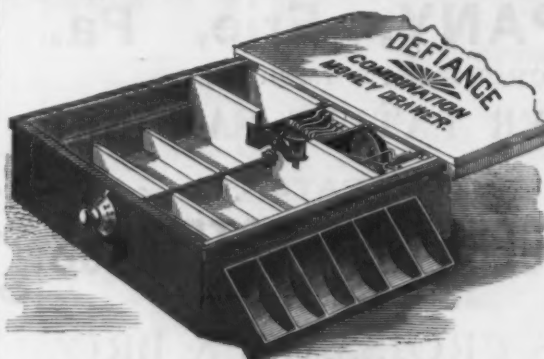
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The Only Safe Drawer in Market.

The five keys under the Drawer work on weights, instead of springs—which soon work loose, so that anybody can detect the combination.

The combination lock (shown in cut) works on similar principle to a safe, affording 1200 changes and absolute safety. It works independent of the keys, and need not be used to lock or unlock the Drawer, except when additional protection is desired during absence from the store. The speed dial is made of black walnut, and the Drawer need be opened only four inches to get at all the compartments. There are six spaces for bills. The alarm bell is of fine quality.

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SIMPLE,  
USEFUL  
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DURABLE.

STAPLE  
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BROOMS.

Beware of Infringements.

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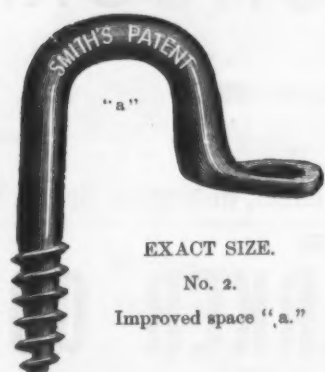
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Stones for Machinists, Carpenters, Farmers and  
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"A Good Padlock is made secure by Smith's Patent Screw Staples and Hasps."



EXACT SIZE.  
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Improved General Dimensions.

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**New Model Top Snap CHAMPION Single Breech-Loading Shot Gun.**



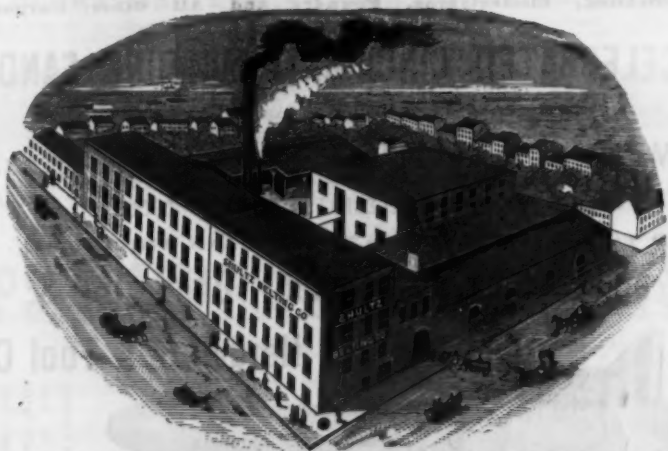
These Guns have Pistol Grip Stock, Rebounding Lock and Patent Fore-end Fastening. For Descriptive Catalogue and Prices to the Trade, address; the manufacturers.

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MANUFACTURERS OF  
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VASES**

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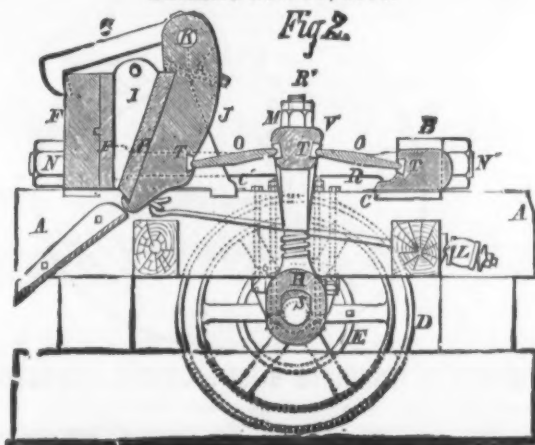
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The most economical and reliable Crusher in use. Superior in all respects to our old style Blake Crushers, and rapidly superseding them and all imitations. For railway ballast, Macadam road making, and crushing of ores of all kinds it has no competitor.

This machine dispenses with cast iron frame and pitman of our old forms. All strains re on wrought iron or steel.

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THE BEST AND MOST HANDY TOOL FOR  
A CARPENTER MADE,



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To these legs are fitted two sets of divider points, one pair  $\frac{1}{4}$  and one  $\frac{1}{8}$  inches long. One of each pair of divider legs has a reversible point which unscrews, and by being reversed a pencil can be placed in same and used for drawing circles.

Also, we have a pair of caliper legs which fit the same stock, and as they will caliper 16 inches, are invaluable for turning pulleys, and, in fact, all large caliper work in a shop. With the long divider legs a 5-foot circle can be struck. These tools are made of brass and finely finished.

Made in two Styles, Plain or  
Nickel.

Price of plain, postage paid, \$3.50.  
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Manufacturers of all kinds of

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**PRESSES,  
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And Special Tools for Tin Can Makers and  
Sheet Metal Workers.

Send for Catalogue and Price List.

An Anvil; A Vise, with Adjustable  
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FOUR SIZES:  
Prices,  
\$3.50, \$4.50,  
\$5.50, \$6.50.



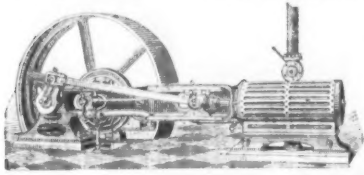
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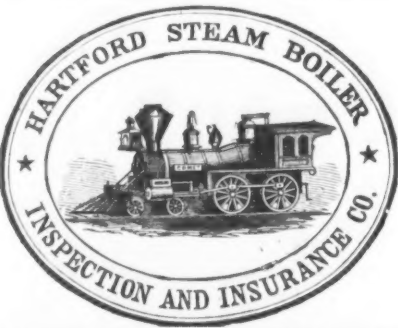


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COVERING ALL LOSS OR DAMAGE TO

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The Business of the Company includes all kinds of Steam Boilers.

Full information concerning the plan of the Company's operations can be obtained at the

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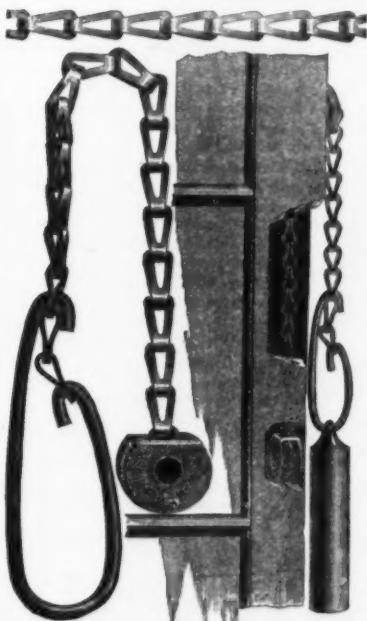
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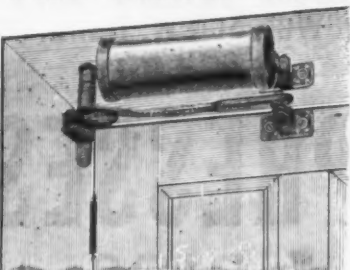
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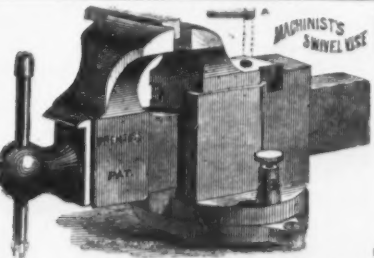
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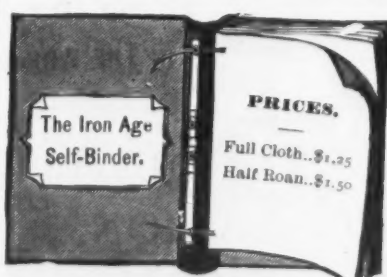
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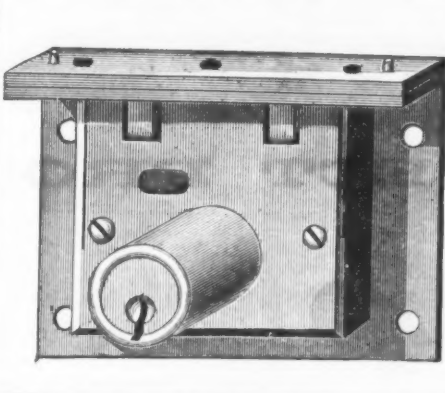


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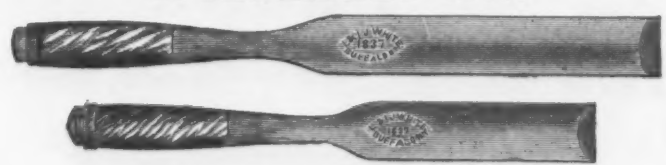
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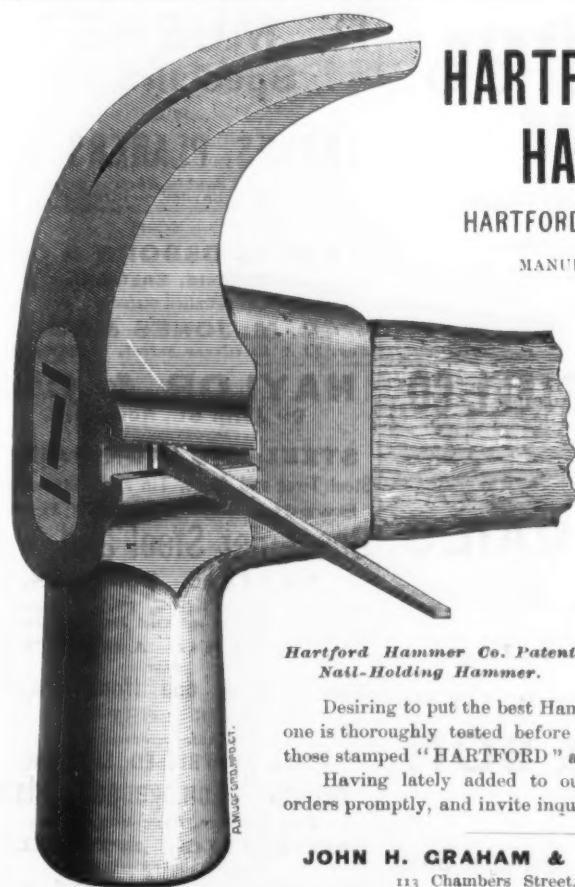
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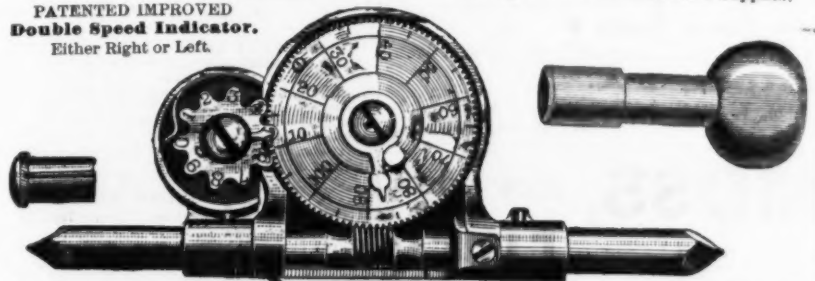
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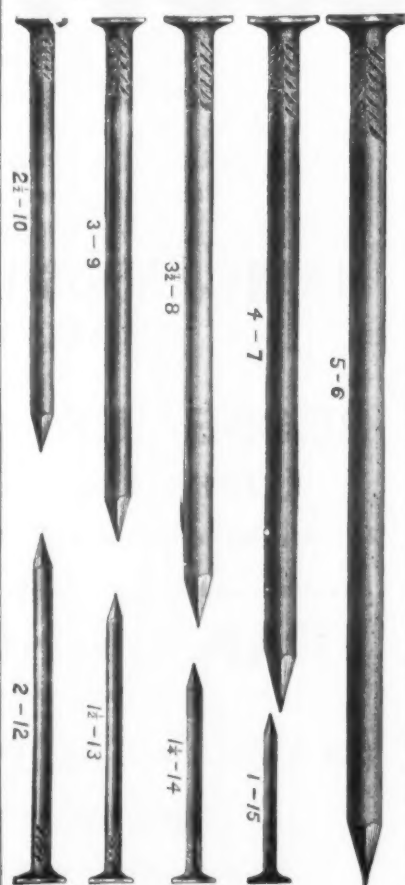
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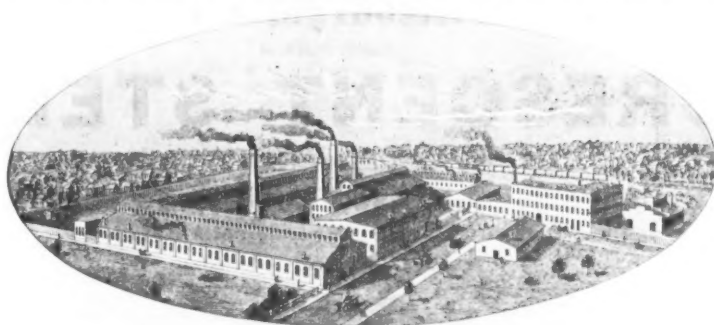
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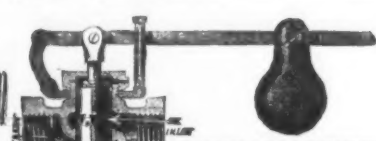
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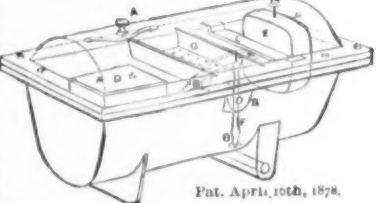


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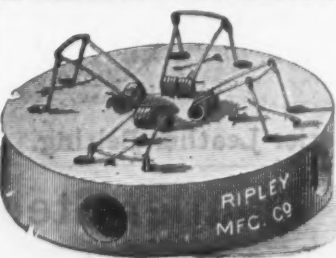
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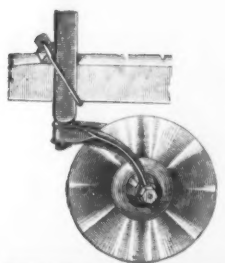
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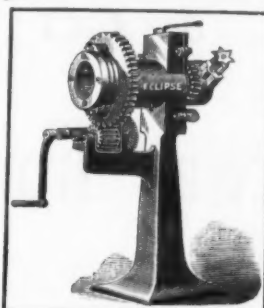
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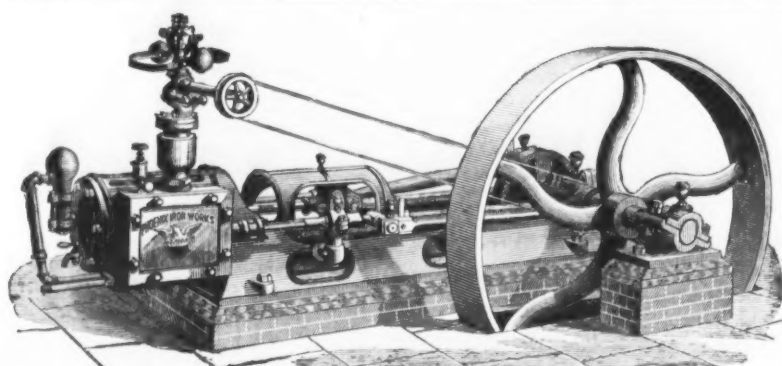
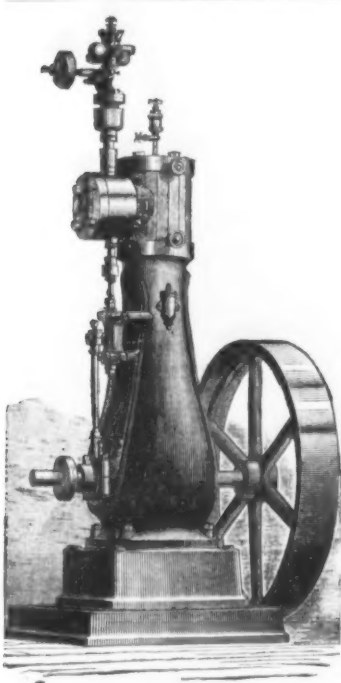
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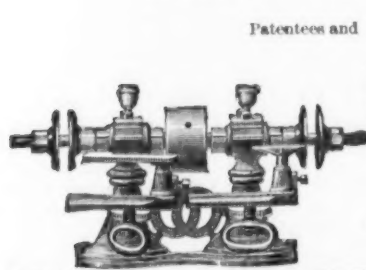


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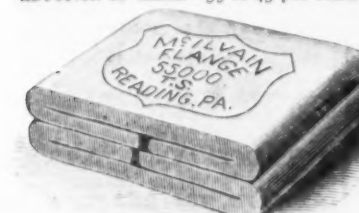
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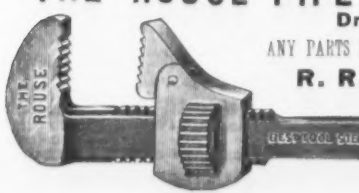
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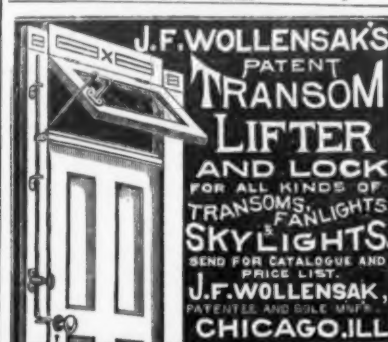
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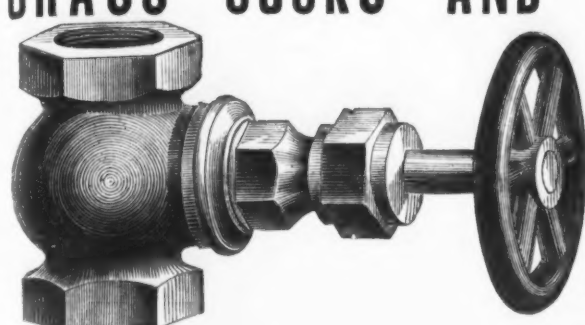
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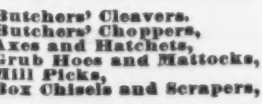
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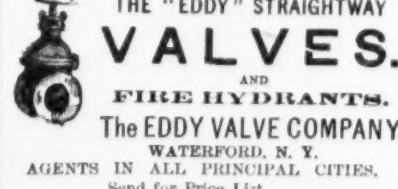
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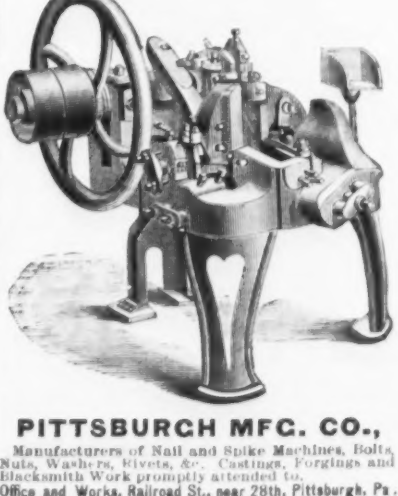
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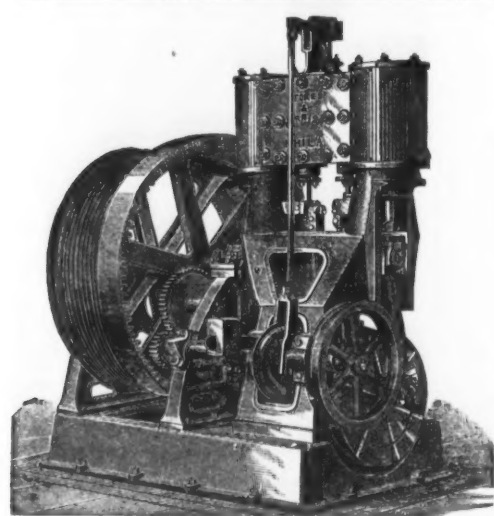
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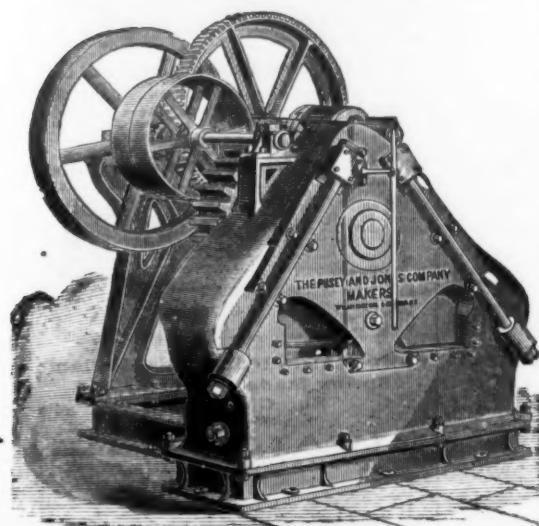
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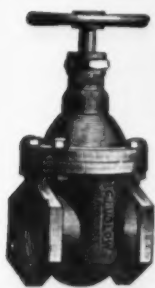
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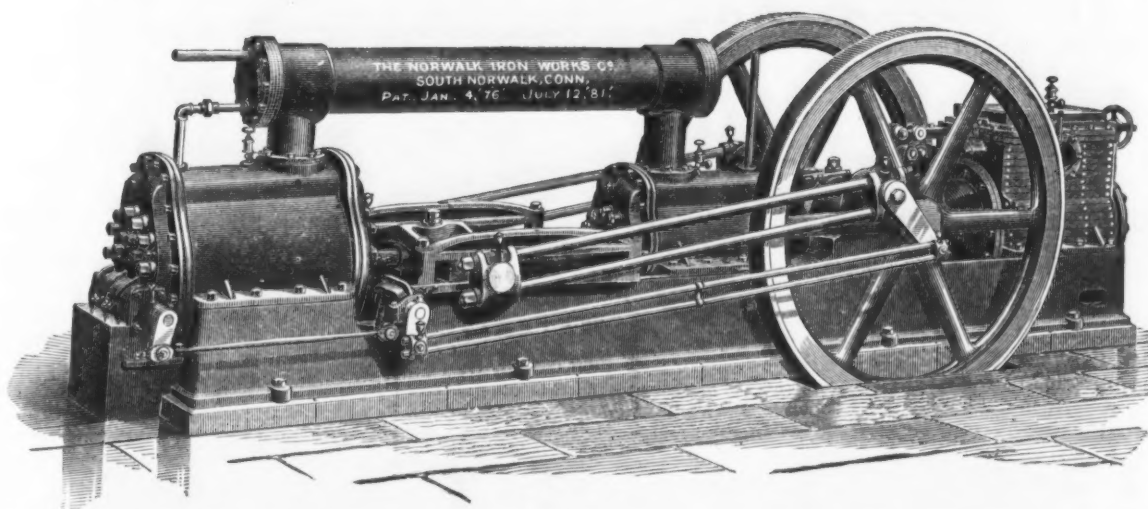
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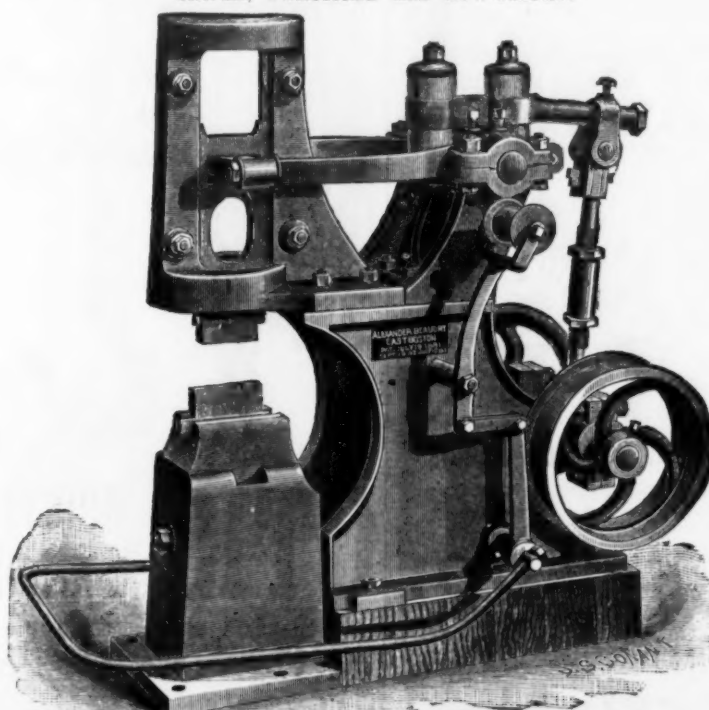
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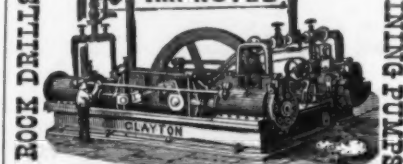


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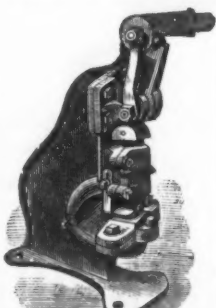
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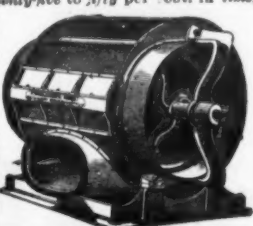
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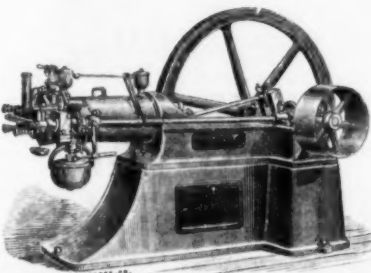
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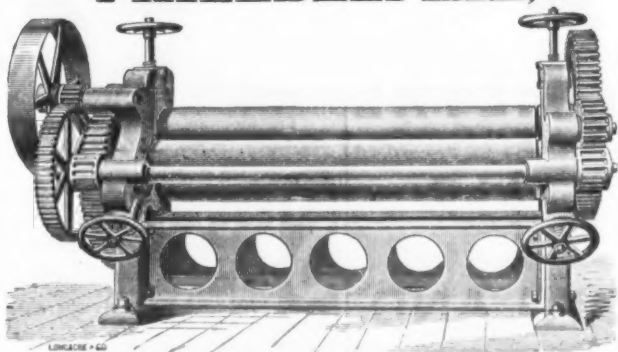
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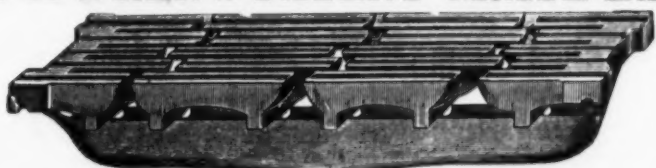
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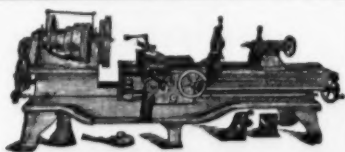
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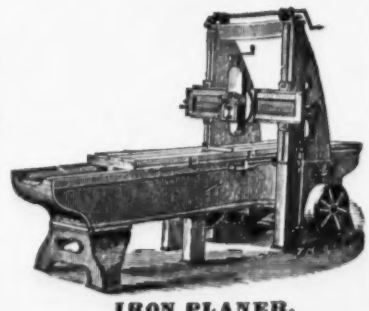
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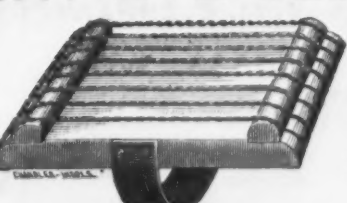
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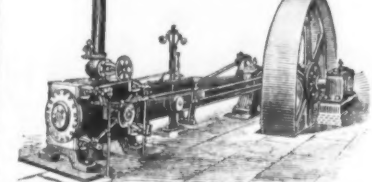
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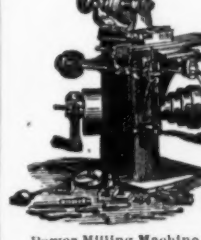
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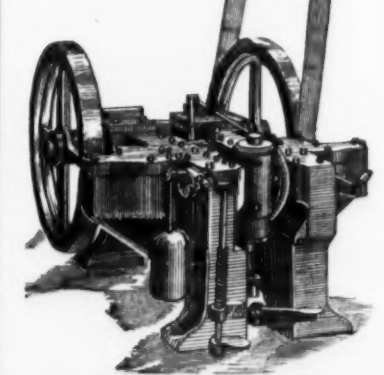
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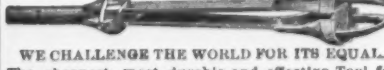
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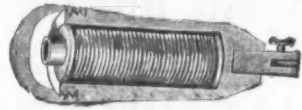
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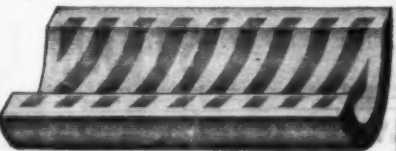
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